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Final Report on 2016 Census Options: Proposed Content Determination Framework and Methodology Options

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1. Executive summary

Statistics Canada and the 2016 Census Strategy Project

Statistics Canada's mandate is to ensure that Canadians have access to a trusted source of statistics that meet their highest priority information needs. The efficient production of relevant, accessible, high-quality statistics helps to ensure that the Canadian economy functions efficiently and our society is governed effectively (Statistics Canada 2011a).

As part of this mandate, Statistics Canada is responsible under the *Statistics Act* (R.S.C., 1985, c. S-19) for conducting the Census of Population every five years. By law, the government (by an order in council) prescribes the questions to be asked in the census. By the same law, each person is required to provide the information requested in the census and Statistics Canada must protect the confidentiality of the personal information provided by respondents.

Since 1971, Statistics Canada's Census Program[1] has used two questionnaires: a long form, distributed to a sample of households, which contained the full set of questions; and a short form, distributed to the remaining households, which contained only a basic set of questions. Up to and including 2006, both the short and the long forms were mandatory.

In the summer of 2010, the government approved 10 questions to constitute the 2011 Census. This short form remained mandatory and was distributed to all households. The government asked Statistics Canada to collect the remaining information proposed to be collected in the 2011 Census (mandatory long-form questionnaire) through a voluntary sample survey, named the National Household Survey (NHS). At the time, the notion of privacy intrusiveness was brought to the forefront, raising questions as to whether Canadians should be obliged to answer certain questions and whether the information collected by the Census Program is relevant.

As part of Statistics Canada's customary process to review and evaluate its statistical programs, and in light of the changes to the 2011 Canadian Census Program and changes to census-taking approaches internationally, Statistics Canada launched the 2016 Census[2] Strategy Project in December 2010. The objective of this project was to study options and deliver a recommendation to the federal government on the methodology of the 2016 Census Program in 2012. While this timeframe is needed to ensure a decision on approach is made in time to then allow sufficient time for the planning, development, testing and implementation of the methodology for 2016, it does not provide sufficient time to fully analyze the 2011 NHS data quality, analysis that will be completed in 2013 when the NHS results are released.

The project reviewed the approaches for population censuses that exist around the world and evaluated their applicability to the Canadian context, as well as their adherence to Statistics Canada's mandate and business model. It comprised a review of the constitutional and statutory requirements and the provision of a content determination framework, including criteria for inclusion of content in the 2016 Census Program and beyond.

1. For the purpose of this report, the term 'Census Program' will be used to refer in a general way to the Canadian Census of Population, either the short and long forms from 1971 to 2006, the 2011 Census of Population and National Household Survey or any other Census of Population prior to 1971.
2. It was understood that census here referred to the Census Program as defined earlier.

International perspective

Conducting a census is an important statistical undertaking around the world. Censuses are so essential that the United Nations has issued, since 1958, principles and recommendations for population and housing censuses, including recommended characteristics of the population and housing to be measured. The introductory paragraphs of the last revision of the principles and recommendations (United Nations 2008) speak to the importance of the censuses:

> The most important capital a society can have is human capital. Assessing the quantity and quality of this capital at small area, regional and national levels is an essential component of modern government.
>
> Aside from the answer to the question 'How many are we?' there is also a need to provide an answer to 'Who are we?' in terms of age, sex, education, occupation, economic activity and other crucial characteristics, as well as to 'Where do we live?' in terms of housing, access to water, availability of essential facilities, and access to the Internet.

For the international statistical community, the census is more than just a simple headcount of the population; it is a Census of Population and Housing, including the characteristics of individuals and housing units.

The Canadian Census Program up to 2011

In Canada, the constitutional requirement for a decennial (years ending in '1') Census of Population dates back to the proclamation of *The British North America Act, 1867* (now known as the *Constitution Act, 1867*). The constitutional requirement for a quinquennial (years ending in '6') census still stems today from the *Constitution Act, 1907* and the *Constitution Act, 1930* as the population counts for Manitoba and Saskatchewan are still below the limits set by these enactments. The requirement for a nationwide quinquennial census has been part of the *Statistics Act* since 1970.

The *Statistics Act* does not specifically define the word 'census' and does not specify which questions are to be included in the census. It states that the census is a census of the population and that the census of population is to be taken in a manner that ensures that counts of the population are provided for each federal electoral district of Canada. Section 21 of the Act provides the power to the Governor in Council to establish the census questions and, as per section 8 of the Act, these questions can only be mandatory. This is in contrast to several other countries, where examples of more explicit and detailed census legislation were found.

In practice, the Census Program in Canada has never been a simple headcount of the population, nor has it been a static process. The content of the Census Program has evolved to respond to the needs of an evolving society and increasingly diverse population. Some content has been added through the years (e.g., immigrant characteristics in 1901, language spoken at home in 1971, Aboriginal identity and population group in 1996) while some other content was removed (e.g., wartime service, availability of hot and cold running water, access to a bath or shower and presence of flush toilets in 1971). Question wording and response categories have also changed over time to reflect social realities. For example, in 1871, the only options for 'marital status' were married, widowed or other. In 2001, the definition of common-law couples was changed to include members of the opposite sex or of the same sex living together as a couple, but who are not legally married to each other. The 2006 cycle was the first Census Program to count same-sex married couples, reflecting the legalization of same-sex marriages at that time.

The Census Program in Canada has always relied on a traditional census approach, i.e., one that collects the characteristics from the individuals and housing units at a specific point in time. The fundamental approach has not changed, but the methodology has significantly evolved over the years to improve the efficiency of the Census Program, to reduce respondent burden, to address concerns of privacy and confidentiality, and to maintain the relevance of the Census Program data and improve their quality. Examples of such methodological developments include the introduction of machines for processing census returns (1921), the use of sampling (1941), the measurement of census undercoverage (1961), self-enumeration (1971), mail-out of questionnaires, centralized follow-up and completion by Internet (2006).

Important findings

Discussions undertaken with data users over the summer and fall of 2011 as part of the 2016 Census Strategy Project confirmed the critical role played by the Census Program in delivering information on a range of topics, with over 800 uses of Census Program data reported.[3] First and foremost, population counts produced by the Census Program are required explicitly by numerous pieces of legislation, meaning census data are explicitly mentioned. These population counts are at the heart of Statistics Canada's Population Estimates Program (PEP) that relies on the most recent Census Program data, along with administrative data provided by other federal, provincial and territorial government departments, to produce annual and quarterly estimates of the Canadian population at various levels of geography between censuses. The PEP responds to statutory requirements for the calculation of revenue transfers and cost-sharing programs between the various levels of government (Statistics Canada 2011b) and produces information to calculate major federal transfers to the provinces and territories under the *Federal-Provincial Fiscal Arrangements Act*. It is also a source of information for the allocation of House of Commons seats to provinces in the recent *Fair Representation Act* that received Royal Assent on December 16, 2011. The PEP is also used as a source of benchmark data for many other social and household surveys at Statistics Canada and contributes to the integrity of the broader social statistics system.

Other data produced by the Census Program also respond to key legislation. The official languages content is an example where there is an explicit legislative requirement for the use of census data for specific language variables where it is stated in subparagraph 3(a)(ii) that the method of estimating the "English or French linguistic minority population" is on the basis of "after the results of the 1991 census of population are published, the most recent decennial census of population for which results are published..." (*Official Languages (Communications with and Services to the Public) Regulations*, SOR/92-48). The Census Program provides data at low level of geographies and for small populations where there is no alternative data source. For example, Human Resources and Skills Development Canada, the Public Service Commission and Treasury Board Secretariat reported that *Employment Equity Regulations* require data on Aboriginal peoples and visible minorities which are not available in administrative databases but are provided by the Census Program.

The quality of the 2011 Census Program data has not been fully assessed and indeed the evaluation of data quality will continue for many more months as Statistics Canada conducts the different stages of

3. Stakeholders and data users in the federal, provincial and territorial governments, as well as representatives of local governments and those in the non-government sector, were asked to describe their uses of Census Program data. Feedback of these discussions does not necessarily reflect all the uses by these groups, as time constraints prescribed a prioritization of uses to be reported. Further, not all stakeholders were included given the time limits for collecting and analyzing the feedback.

evaluation leading to the release of the information. However, some preliminary results can inform the discussion for 2016.

The 2011 Census preliminary[4] response rate was 98.1% nationally, one percentage point higher than the 2006 Census final response rate. The 2011 NHS preliminary[5] response rate was 69.3% nationally, above the planned rate of 50% and in line with other voluntary surveys at Statistics Canada. Almost 54% of Canadian households completed their 2011 Census questionnaire on the Internet. About 64% of all NHS respondents chose to complete their NHS online.

With a preliminary response rate of 69.3%, the final NHS response rate that will be obtained after processing will not reach the level of the 2006 Census long-form final response rate of 93.5%. Statistics Canada also has early indications that among those who chose to respond to the 2011 NHS, fewer completed all questions than in the 2006 Census long form.

It is unknown at this point what the impact of the non-response will be on the quality of the NHS data, particularly for low geographic areas and small populations, and to what extent this quality will meet users' needs. Statistics Canada has implemented actions during collection and processing to mitigate the impact of non-response on the NHS estimates.

Feasible approach for the 2016 Census Program

Statistics Canada considered three major types of methodology approaches used internationally (UNECE 2006 and 2007) for the 2016 Census Program: the traditional census approach, the census approach employing existing administrative registers and the census approach employing continuous measurement.

The traditional census approach collects basic characteristics from all individuals and housing units (full enumeration) at a specific point in time. More detailed characteristics can be collected either from the whole population or on a sample basis. Collection modes may include personal interviews (canvasser approach), self-completed paper questionnaires, telephone (computer-assisted or not) and Internet. Some data might be replaced by administrative data to ease respondent burden and/or improve quality. The traditional census approach is still the main approach used for census-taking in the world[6] and is the one used by the Canadian Census Program.

The census approach employing existing administrative registers relies at a minimum on a population register and a building/dwelling register to produce basic characteristics on all individuals and housing units at a specific reference point in time. More detailed characteristics can be obtained by linking to other existing administrative registers or administrative data sources (e.g., on education and employment) or by conducting surveys, either by complete enumeration or by sample. This approach is used in Scandinavian countries and increasingly in other European countries.[7]

4. As of August 24, 2011.
5. As of September 30, 2011.
6. The United Nations Statistics Division (UNSD) conducted a survey in June 2009 (United Nations 2011b). Of the 138 countries that responded (out of 233), 115 said that the traditional census was their main source of data to produce their population counts.
7. Twenty of the fifty United Nations Economic Commission for Europe (UNECE) member countries that responded to the UNSD survey in June 2009 reported relying either partially or completely on administrative registers in the 2010 round of censuses (UNECE 2010). The UNECE currently has 56 member countries, including Canada, the United States and some countries in Asia.

The census approach employing continuous measurement collects characteristics from individuals and housing units, where part or all of the collection is performed on a continuous basis. It involves a form of rotating sample. Collection modes may vary including face-to-face interviews (canvasser approach), telephone (computer-assisted or not) and mail. Some data might be replaced by administrative data to ease respondent burden and/or improve quality. The data collected on a continuous basis must be pooled to produce estimates at the different levels of geographies. As such, the estimates are not traditional point-in-time estimates; rather, they represent rolling averages over a period of time. The United States (U.S.) and France are the two notable examples of this approach. The United States continues to conduct its traditional decennial census for collecting basic characteristics of population and housing units, but the more detailed characteristics are collected by the American Community Survey through a monthly sample of addresses (U.S. Census Bureau 2009). France has not kept any form of traditional census and conducts what is called a rolling census. For small communes (municipalities with less than 10,000 residents), a complete census is conducted once every five years on a rotating basis. For large communes (10,000 residents or more), an 8% sample of addresses is surveyed each year (Godinot 2005).

Drawing on earlier work conducted by Royce (2011), Statistics Canada assessed whether the necessary conditions for using each approach were likely to be present in time for the 2016 Census Program. The results of this assessment indicate that of the three approaches examined, the traditional census approach is the only viable methodology for the 2016 Census Program.

The necessary conditions for the conduct of a traditional census approach are expected to continue to exist for 2016 in Canada. The degree of public cooperation with the census (mandatory) is still at high levels. While the response to the NHS is comparable to Statistics Canada's other voluntary household surveys, further study will be required once the assessment of the quality of the NHS results is completed to determine the extent to which the NHS was able to deliver the required quality estimates for lower geographic areas and small population groups.

Canada does not meet the necessary conditions of a census approach employing existing administrative registers. In particular, this approach requires both a population register and a universal personal identification number. Neither exists in Canada, nor are they likely to exist in the short or medium term. In a written response to Statistics Canada, the Privacy Commissioner of Canada and the provincial and territorial privacy commissioners have clearly expressed great concerns for the creation of a population register and a personal identification number in Canada (Privacy Commissioner of Canada 2011).

Adoption of a census approach employing continuous measurement is also not feasible for the coming Census Program. To replace all or part of the 2016 Census Program, such a methodology would have to be in place by 2012 so that estimates for all required levels of geographies can be produced starting in 2017, i.e., in the same timeframe as a traditional 2016 Census Program. France and the United States have confirmed to Statistics Canada the importance of prior and extensive discussions with census stakeholders and policy makers. No funding has been allocated for consultation, development and testing for a continuous measurement survey at this point.

Moving forward, the balance between relevance, quality, respondent burden and privacy will need to be examined as part of the content determination process for the Census Program. For 2016, external stakeholders will be consulted on their uses of the data to determine relevance (including timeliness) and quality requirements. In particular, priorities would be assigned based on the strength of user need. The consultation findings would be examined in light of respondent burden, societal privacy concerns and other considerations, such as costs, that Statistics Canada must take into account. Results of this

assessment could be the division of the content into questions to be asked on a full enumeration basis, questions not to be collected in the 2016 Census Program and, potentially, those questions to be asked on a sample basis. The 2016 Census content will continue to be prescribed by the Governor in Council.

Other directions for 2016 and beyond

As is customary following a Census Program cycle, Statistics Canada is presently reviewing all of its operations and will incorporate improvements and efficiencies whenever possible. Three examples follow:

The Address Register has enabled the 2011 Census Program to successfully mail out letters and forms to close to 80% of the private dwellings in Canada. Work continues to further improve the coverage of the Address Register for the 2016 Census Program, including targeted field verification and use of administrative data sources. Statistics Canada is working with external stakeholders on how to best manage regional varieties of addresses. In addition, it will work with Canada Post Corporation to optimise the use of civic style addresses to expand the mail-out methodology for the 2016 Census Program.

The Internet has become the primary mode of collection for the Census Program, as almost 80%[8] of Canadian households currently have access to the Internet. In 2011, almost 54% of Canadian households completed their 2011 Census questionnaire on the Internet, a significant increase from 18% in the 2006 Census. As well, about 64% of all NHS respondents chose to complete the NHS online. With Internet now the primary mode of collection, Statistics Canada is examining the opportunities this offers for activities such as questionnaire design and data processing.

While the census approach employing existing administrative registers is not currently feasible in Canada, the use of administrative data within a traditional Census Program can nevertheless reduce respondent burden and improve quality. Statistics Canada has for a number of Census Program cycles used administrative data for the Address Register, for quality assessment and as a substitute for questions (i.e., income). The agency will continue to examine the potential of using new and existing sources of administrative data for the 2016 Census Program.

This report traces among others the evolution of the Canadian Census Program since 1871, and how content, methods and quality assurance practices have adapted to changes in society. It is anticipated that future cycles will also experience change and would benefit from the tradition of the Census Program five-year cycle to evaluate and test new methodologies and technologies. These often come to complete fruition only in later cycles, as was the case in 2011 when Internet, after two cycles of testing and progressive implementation, surpassed paper as the primary mode of collection. The 2011 Census Program also saw the transformation of the mandatory long form to the voluntary National Household Survey.

This report concludes that the traditional census approach is the only viable approach for 2016. Research on alternative methodologies should continue on a long-term horizon, beyond the next Census Program cycle. Research to date has indicated that unless there are significant changes to the Canadian context, many of the issues surrounding the alternative approaches will remain for 2021 and beyond. For example, the discussion of a population register and a personal identification number has raised great concerns from the Privacy Commissioner of Canada and her provincial and territorial counterparts. There has also been no demonstrated support by Census Program stakeholders for the census approach employing continuous measurement. As well, the development timelines and costs for census approaches other than the traditional one are considered to be quite significant.

8. 2010 Canadian Internet Use Survey, Statistics Canada, *The Daily*, May 25, 2011.

If changes are envisioned for 2021 or even later cycles, it is thus important that research continues. A key element of this research will include increased use of administrative data in the Census Program and the Population Estimates Program to reduce respondent burden and/or improve quality and efficiency. This will involve examining the potential for expanding the use of existing administrative data files and exploring partnerships to use additional ones, in accordance with privacy-related policies and directives.

Part A:
Context

2. Introduction

Statistics Canada's mandate is to ensure that Canadians have access to a trusted source of statistics that meet their highest priority information needs. Statistics Canada is responsible under the *Statistics Act* (R.S.C., 1985, c. S-19) for conducting the census every five years. By law, the government (by an order in council) prescribes the questions to be asked in the census. By the same law, each person is required to provide the information requested in the census and Statistics Canada must protect the confidentiality of the personal information provided by respondents.

Since 1971, Statistics Canada's Census Program has used two questionnaires: a long form, distributed to a sample of households, which contained the full set of questions; and a short form, distributed to the remaining households, which contained only a basic set of questions. Up to and including 2006, both the short and the long forms were mandatory. In 2011, a voluntary sample survey called the National Household Survey (NHS) was conducted, replacing the mandatory long-form census in providing a detailed statistical portrait of Canada and its people. The short form remained mandatory and formed the census, distributed to all households. **For the purpose of this report, the term 'Census Program' will be used to refer in a general way to the Canadian Census of Population, either the short and long forms from 1971 to 2006, the 2011 Census of Population and NHS or any other Census of Population prior to 1971.**

Conducting a census is an important statistical undertaking, not only in Canada but in most countries. In a report presented by the Secretary-General at the forty-second session of the United Nations Statistical Commission, he noted that by the end of the 2010 round of population and housing censuses (spanning the period 2005 to 2014), 98% of the world's population should be counted (United Nations 2011a). Censuses are so essential that the United Nations has issued, since 1958, principles and recommendations for population and housing censuses. In the last revision prepared for the 2010 round of censuses (United Nations 2008), the introductory paragraphs speak to the importance of the censuses:

> The most important capital a society can have is human capital. Assessing the quantity and quality of this capital at small area, regional and national levels is an essential component of modern government.
>
> Aside from the answer to the question 'How many are we?' there is also a need to provide an answer to 'Who are we?' in terms of age, sex, education, occupation, economic activity and other crucial characteristics, as well as to 'Where do we live?' in terms of housing, access to water, availability of essential facilities, and access to the Internet. The answers to these questions provide a numerical profile of a nation which is the sine qua non of evidence-based decision-making at all levels, and is indispensable for monitoring universally recognized and internationally adopted Millennium Development Goals (United Nations 2008, p. 1).

While the traditional census remains the main approach to collecting this information,[9] there is a shift internationally towards other census approaches. In the United Nations Economic Commission for Europe (UNECE), of which Canada is a member, 10 of the 37 countries (see Table 1) that conducted a traditional census in the 2000 round and responded to the survey have moved to a new approach for the 2010 round (UNECE 2010). In 8 of the 10 cases, the new approach relies either partially ('combined') or

9. The United Nations Statistics Division conducted a survey in June 2009 (United Nations 2011b). Of the 138 countries that responded (out of 233), 115 said that the traditional census was their main source of data to produce their population counts.

completely ('register-based only') on administrative registers,[10] bringing to 20 the number of UNECE responding countries using such an approach in the 2010 round. Two countries, France and the United States, have moved to an approach ('other') that involves a form of sample survey conducted on a continuous basis rather than at a specific point in time.[11] High costs concentrated in the one- or two-year period around the census year, the difficulty in maintaining participation in such a large-scale operation and the need for more frequent data are among the reasons most often cited for the change to a new approach.

Table 1 Number of UNECE responding countries by census type in 2000 and 2010 rounds

Census type		2010 round				
		Traditional	Combined	Register-based only	Other	Total
2000 round	Traditional	27	7	1	2	37
	Combined	0	6	0	0	6
	Register-based only	0	0	3	0	3
	No Census	1	2	1	0	4
	Total	28	15	5	2	50

Note: The United Nations Economic Commission for Europe (UNECE) currently has 56 member countries, including Canada, the United States and some countries in Asia. Of the 56, 50 responded to the survey.
Source: United Nations Economic Commission for Europe, Conference of European Statisticians, 2010.

Other countries that planned a traditional census in the 2010 round are contemplating changes for the future. On April 1, 2011, the Office for National Statistics (ONS) in the United Kingdom launched the four-year Beyond 2011 program to establish and test census models for meeting future user requirements for population and wider sociodemographic statistics. Critical among these will be the use of administrative data (Nolan 2011). The ONS expects that it will complete its work on 2021 Census options development in 2014.

In New Zealand, the traditional census planned for March 2011 was postponed due to the earthquake in Christchurch, and will now be conducted in March 2013. Statistics New Zealand has examined the feasibility of moving to a register-based census (Bycroft 2010) and concluded that New Zealand met none of the pre-conditions for introducing such an approach. Statistics New Zealand is currently preparing a paper for presentation to government in early 2012 on the strategic direction for the New Zealand census. The draft proposal includes a long-term vision of an administrative census; a phased approach towards this vision with decision points for government; and recommends a continuation of a five yearly census, with efficiencies focussed on reducing real costs, until alternative options become feasible.

10. A register refers to a systematic collection of unit-level data organized in such a way that updating is possible. Updating is the processing of identifiable information with the purpose of establishing, updating, correcting or extending the register. An administrative register is a register that is primarily used in an administrative information system, i.e., in the production of goods and services in public or private institutions or companies (UNECE 2007, p. 49).
11. France and the United States use each a different form of continuous measurement. France has completely replaced its traditional census by a repeated annual sample survey. The United States still conducts a decennial 'short-form' traditional census, but its long-form census has been replaced by a repeated monthly sample survey known as the American Community Survey (see Section 7.3 for more details).

The move in Canada from a mandatory long-form census questionnaire to the voluntary National Household Survey (NHS) for the 2011 Census Program brought the notion of privacy intrusiveness to the forefront, raised questions as to whether Canadians should be obliged to answer certain questions and whether the information collected by the Census Program is relevant. As part of Statistics Canada's customary process to review and evaluate its statistical programs, Statistics Canada launched the 2016 Census Strategy Project in December 2010. The objective of this project was to study options and deliver a recommendation to the federal government on the methodology of the 2016 Census Program in 2012.

The 2016 Census Strategy Project operated under a very tight timeframe. The recommendation for 2016 had to be delivered to the government early enough in 2012 to then allow sufficient time for the planning, development, testing and implementation of the 2016 Census Program methodology, and very importantly, the approval of funding for the planning and development phase. The timeline limited significantly the depth of the analysis in specific areas, as noted in the report.

At the same time, the project was wide in scope. It reviewed the approaches for population censuses that exist around the world and evaluated their applicability to the Canadian context, as well as their adherence to Statistics Canada's mandate and business model. The project included a review of the constitutional and statutory requirements for the census and provided a content determination framework, including criteria for inclusion of content in the 2016 Census Program. At the same time, Statistics Canada identified areas worth investigating for the Census Program beyond 2016.

To support the 2016 Census Strategy Project, Statistics Canada put in place a rigorous governance structure. Internally, the project received guidance from an advisory committee consisting of directors general from relevant branches. Direction was also obtained from a steering committee of assistant chief statisticians. Externally, the project got advice through the existing structure of advisory committees, including the National Statistics Council (NSC), the most senior of these external advisory committees. Finally, a subcommittee of the NSC and an Expert Panel Review Committee of six international experts in official statistics and census-taking were struck specifically to review and advise on Statistics Canada's work on the 2016 Census Strategy Project.

The result of this 12-month project is presented in this report. Part A of the report continues with Section 3, which describes the evolution of changes in the Canadian Census Program, including drivers for change, and how these changes were introduced. Section 4 focuses particularly on the changes to the 2011 cycle and reports initial data quality findings.[12]

Part B of this report is about the Census Program objectives and content needs. Sections 5 and 6 discuss the definition of a census and situate Census Program objectives in the context of legislative review and discussion with users conducted as part of the project.

Part C of this report discusses the Census Program methodology in response to the objectives and content needs presented in Part B. Section 7 builds on an independent report (Royce 2011) and presents three census-taking approaches that exist internationally. It lists the pre-conditions presented in Mr. Royce's report for conducting such approaches in any given country and adds to his assessment the results of additional reviews conducted by Statistics Canada to determine which approaches are possible for 2016 in Canada. Section 8 presents a process to determine content needs for the 2016 cycle in a structured and transparent way. Section 9 presents conclusions for the 2016 Census Program.

12. The complete evaluation of any Census Program cycle takes about 30 months. Although a large part of the evaluation of the 2011 cycle will be completed by March 2012, it is only when the last data results of the NHS will be released in late 2013 that the full evaluation will be completed.

3. Evolution of the Canadian Census Program: 1871 to 2006

The Census Program has undergone many changes in the 140 years since Confederation.[13] It has evolved both to meet the changing needs of the country for information about itself, and to adapt to changes in the social, legislative, administrative, financial and technological environment in which the Census Program is carried out. In addition, the Census Program is not isolated from other parts of the statistical system; changes in the latter affect Census Program content and methodology, and conversely. This section describes the evolution of the content and the methodology of the Canadian Census Program, as well as the role played by research and testing, between 1871 and 2006. The 2011 Census Program is covered in Section 4.

3.1 Evolution of content

The topics asked in the Census Program have always considered issues of the day and the associated information needs. Thus questions evolved over time, reflecting the changes in Canadian society while maintaining, to the extent possible, the integrity of time series. This section discusses briefly the development of Canada's statistical system and highlights the evolution of the Census Program content in light of the issues and environment of the time.

The first census of Canada, following Confederation in 1867, was taken in 1871. The main goal of the Census Program in 1871 was to determine appropriate representation by population in the new Parliament, and since 1871, decennial Census Program data have been the cornerstone of representative government in Canada.

At that time, the Census Program was the only means of gathering information about all aspects of the population and the economy. Thus it had nine questionnaires for a total of 211 questions covering area, land holdings, vital statistics, religion, education, administration, the military, justice, agriculture, commerce, industry and finance. The population questions included the age, sex, religion, education, race, ancestral origins and occupation of each person—topics which are still asked in the Census Program today.

By 1901, the need for information on the wave of immigrants arriving in Canada, in conjunction with the more general requirement for extended and improved economic statistics, inspired the new *Census and Statistics Act* of 1905 (Worton 1998, p. 38).

A mid-decade Census Program of Manitoba, Alberta and Saskatchewan was introduced in 1906 to measure the rapid growth and development of the Prairies. This was part of the agreement for the Prairie provinces to join Confederation (see Section 5.2.1).

With the creation of the Dominion Bureau of Statistics in 1918, other household and business surveys were introduced, decreasing the need for certain content in the Census Program. For example, the introduction of a separate Vital Statistics Program meant that the Census Program of 1921 no longer had a questionnaire for persons who had died. In fact, there were only five questionnaires in 1921: population; agriculture; animals, animal products and fruits not on farms; manufacturing and trading establishments; and a supplemental questionnaire for the blind and for deaf-mutes.

13. Prior to Confederation in 1867, censuses were taken in the British and French colonies of what is now Canada. This section focuses on censuses held after Confederation, the first of which was in 1871.

The rapid growth after World War II, with its large population movements among provinces and into urban areas, demanded more frequent information on Canada's population, and in 1956, the Dominion Bureau of Statistics carried out the first nationwide quinquennial Census Program.

In 1971, the new *Statistics Act* made it a legal requirement for Statistics Canada, formerly the Dominion Bureau of Statistics, to hold censuses of population and of agriculture every five years.

The 1986 cycle broke with the pattern, established in 1956, of alternating full and shorter questionnaires for the Census Program. By repeating most of the questions asked in the full Census Program of 1981, many procedures and processing systems could be re-used, resulting in significant cost savings while producing a full range of data.

The 1986 cycle also saw a major expansion of the use of the Census Program to identify specific subpopulations for postcensal surveys, when a postcensal survey on health and activity limitations was introduced. This methodology reduces overall respondent burden and is a cost-effective means of collecting information. Since then, postcensal surveys have been used to respond to important information needs on geographically dispersed segments of the Canadian population or for very targeted groups, which cannot be obtained from other sampling means used for broad general household surveys such as the General Social Survey or the Canadian Community Health Survey.[14]

Examples of content changes to the Census Program which responded to emerging information needs include:

- In 1901, questions on the characteristics of immigrants—place of birth, year of immigration, racial origin or nationality, mother tongue—were added because of the policy to settle the Prairies.
- In 1931, in response to the Great Depression, questions were asked to gauge the level of unemployment and to analyze its causes.
- In 1971, a new question on language spoken at home was added to complement data on mother tongue and knowledge of official languages; this was to provide information on the degree of assimilation of different language groups. Also in 1971, questions on weeks worked and full-time and part-time employment and place of work were added. The first permitted a distinction to be made between types of employment, an important difference when interpreting employment-income data. Place of work was introduced to help plan transportation facilities and to identify commuting areas used to determine census metropolitan area boundaries.
- The 1971 cycle was the last to ask about wartime service, availability of hot and cold running water, access to a bath or shower and presence of flush toilets.[15] In 1991, the decennial question on how many children were ever born to women aged 15 and over was asked for the last time.
- The 1996 cycle saw the addition of new questions on Aboriginal identity and population group to meet information needs related to an increasingly diverse population, in particular, for employment equity. Mode of transportation to work was added to better understand commuting patterns and the use of public transit, while questions on household activities or unpaid work were added to shed light on the contributions of care givers.

14. In 1991, the Health and Activity Limitation Survey was repeated and a new Aboriginal Peoples Survey (APS) was conducted. In 2001, there were three postcensal surveys (Participation and Activity Limitation Survey [PALS], APS and Ethnic Diversity Survey) and in 2006, there were five (PALS, APS, Aboriginal Children's Survey, Survey on the Vitality of Official-Language Minorities and Maternity Experiences Survey).
15. 1971 Census of Canada Content Manual.

- In the 2006 cycle, questions on education were re-worded to improve both relevance and response quality, including a new question on location of study to respond to the need for more precise information on credential recognition.

As well, question wording and response categories changed to reflect social realities. For example, in 1871, the only options for 'marital status' were married, widowed or other. Today, there are five categories: legally married, separated but still legally married, divorced, widowed, or never legally married.

From 1951 to 1971, the term 'head of household' was used, referring to the husband in a husband-wife family. In 1976, the term 'head' was changed to refer to either the husband or wife. The reference to 'head' was dropped altogether in the 1981 cycle, to be replaced by the neutral 'Person 1.'

In 2001, the definition of common-law couples was changed to include members of the opposite sex or same sex living together as a couple, but who are not legally married to each other. The 2006 cycle was the first Census Program to count same-sex married couples, reflecting the legalization of same-sex marriages at that time.

Thus, the Census Program has evolved with the Canadian statistical system, both adapting to societal changes together with the changing needs for information.

3.2 Evolution of methodology

While the methodology of the Canadian Census Program is much different today than in 1871, the motivations for methodological change have remained relatively constant over time, and include the following:

- improving the efficiency of the Census Program to reduce costs and improve timeliness
- minimizing respondent burden while still meeting the need for data
- addressing concerns of privacy and confidentiality
- improving the quality of Census Program data.

Many of the changes to the methodology of the Census Program have addressed more than one of these goals. The major developments in Census Program methods are grouped into collection of data, processing of data, and data quality improvement and measurement.

3.2.1 Collection of data

From 1871 to 1966 inclusive, the Census Program was conducted by the traditional canvassing methodology, where an enumerator visited the dwelling in person to complete the questionnaire with the household. By the mid-1960s, however, societal changes and concerns about privacy had made this approach increasingly expensive and problematic. Self-enumeration, where respondents complete their own questionnaires, was introduced in the 1971 cycle as a means to reduce collection costs, enhance privacy, and improve data quality. The door-to-door methodology is now restricted primarily to remote areas of the country.

Between 1971 and 2001, questionnaires were dropped off by enumerators, who subsequently received the completed forms either by mail or by picking them up at the household. These enumerators edited the questionnaires and followed up with the households, to complete any missing information.

Increasing privacy concerns related to this verification role of the local enumerator were a major driver for change in 2006. Questionnaires were mailed to 66% of households, with drop-off of questionnaires in areas where the Address Register[16] was not yet of sufficient quality. Most importantly, instead of questionnaires being returned to a local enumerator, paper questionnaires were mailed back to a central office, where they were scanned and edited by computer. As well, respondents were offered the option of completing their questionnaire entirely by Internet, further enhancing privacy and improving data quality. Some 18% of respondents took advantage of this new way of completing their questionnaire. Follow-up to complete any missing information was conducted from the central office by telephone. The only contact by an enumerator in the field was for households that had failed to return their questionnaire.

With the development of scientific sampling methods in the 1930s, it was realized that high-quality data could be produced while reducing both costs and respondent burden. The first use of sampling was in 1941, where every tenth household received a supplementary questionnaire on housing. A major expansion of the use of sampling occurred in the 1971 cycle, when it was decided that most questions only needed to be asked of a one in three sample of households. The remaining two thirds of households received only a short version of the questionnaire. The sampling fraction for the long form was further reduced to one in five households in the 1981 cycle, where it remained through to 2006.

The 2006 cycle also saw the first instance of the use of administrative data as a substitute for direct collection of data from the respondents. Respondents were asked for permission to link to their tax return to obtain their income data, and over 82% of respondents agreed to this option, eliminating the need for them to answer a series of detailed income questions, thus reducing respondent burden and improving data quality.

3.2.2 Processing of data

The early Census Program questionnaires were processed and tabulated by hand, unaided by machines of any kind. By 1921, mechanical tabulation methods were beginning to be used, and in 1931, a new sorter-tabulator made production 50 times faster than was previously possible. Census Program processing has continued to take advantage of the latest developments in technology and statistical methods. For example, automated edit and imputation methods were introduced in the 1981 cycle, automated coding of write-in responses was introduced in 1991, and automated edits were built into the Internet version of the questionnaire in 2006. Replacement of many of the manual operations of the Census Program by automation has reduced costs, improved timeliness, improved data quality and enhanced privacy by having less human interaction with respondent data.

The technology for capturing data from questionnaires has also evolved over time. 'Mark-sense' technology was first used in 1951, where answers were recorded in designated positions on the questionnaire and then scanned into the computer. From 1981 to 2001, the key-entry capacity at the Canada Revenue Agency was used to transform the data from paper questionnaires to computer tapes. In 2006, with the centralization of editing and processing, paper questionnaires were scanned and intelligent character recognition technology was introduced. In the case of Internet responses, the data

16. The Address Register is a frame (list) of location-based addresses of all residential dwellings in Canada. It is maintained by Statistics Canada and used solely for the purposes of statistical activities.

entry is done by the respondent directly, with edits applied in real time to catch errors and to allow the respondent to correct them.

Until the 1980s, Census Program results were compiled and published in paper form; for example, the 1871 results were published in five bilingual volumes in 1873. Today, dissemination of results by Internet has largely replaced paper publications. As well as improving the timeliness of dissemination, the Internet allows the data user much more flexibility in finding the exact information sought. For the researcher, the production of public use microdata files and access to information in Statistics Canada's research data centres have enhanced the accessibility of Census Program data while maintaining strict confidentiality protection rules.

3.2.3 Data quality improvement and measurement

The quality of Census Program data is of utmost importance, with the single most important output being the population counts. The Census Program methodologies have developed over the decades to both improve the accuracy of the census population counts and to measure the coverage of the Census Program. Early Census Program cycles concentrated primarily on developing consistent procedures and on supervisory checks of the quality of the enumerator's work. In the 1950s and 1960s, independent measures, such as having local letter carriers check the quality of the enumerators' dwelling lists, began to be introduced. In 1961, the reverse record check[17] was developed to estimate the number of persons missed, and to identify the principal reasons for undercoverage in the Census Program. This led to additional measures being introduced, such as a follow-up of a sample of dwellings classified by the enumerator as vacant and a study of persons temporarily away from their usual place of residence. The results of these studies were included in the official census population counts. Statistical quality control methods were also introduced for manual operations such as enumerator editing and follow-up, coding, and data capture. Methods for producing estimates based on the long-form sample and for estimating the amount of sampling error were also improved during the 1971 to 1986 period.

The results of the 1986 reverse record check showed a significant increase in the level of undercoverage compared to previous Census Program cycles, and undercoverage continued to be unevenly distributed across provinces. As well as affecting the quality of the Census Program results themselves, the increased undercoverage was a serious concern for the Population Estimates Program,[18] which rebases its estimates to the census population counts every five years. Billions of dollars of major federal transfers to the provinces and territories are directly tied to the population estimates, and so coverage became a major concern for the 1991 Census Program.

A two-part strategy was adopted. The first part was to develop new methods to improve coverage; examples included the development and use of an Address Register as a coverage check on the interviewers' address listings (similar to the letter carrier checks which had been conducted in earlier cycles but later dropped for cost reasons), and the addition of new coverage questions on the questionnaire.

17. The reverse record check is a method that samples persons from one or more frames (lists) covering the census target population. Each sampled person is traced to his or her Census Day address, checked against the census return for that address, and classified as either enumerated, missed or out of scope. An estimate of undercoverage can then be derived.
18. The Population Estimates Program was introduced in 1971 as a means to estimate the population intercensally on an ongoing basis.

The second part of the strategy was to expand the coverage measurement program, with the goal of producing estimates of net undercoverage (undercoverage minus overcoverage) that were sufficiently reliable to be used by the Population Estimates Program. The reverse record check was expanded to the territories, the sample size of the reverse record check in the provinces was increased significantly, and a program to estimate the level of overcoverage was developed. The expanded program provided estimates of net undercoverage for the provinces and territories of sufficient quality to be incorporated into the 1991 and subsequent estimates of the Population Estimates Program.

3.3 Role of research and testing

Because many important decisions depend on the Census Program data and the opportunity to 'get it right' occurs only every five years, major changes to both content and methodology need to be thoroughly tested and proven before being introduced in the Census Program. Mistakes are potentially costly, both in terms of wasted money and the unavailability of essential data. Statistics Canada has a long tradition of carrying out tests and experiments before introducing major changes into the Census Program.

Major changes are sometimes tested in a large scale 'dress rehearsal' carried out two to three years in advance of a given Census Program cycle. Tests of new or modified questions may involve large nationwide samples, so that problems of question wording can be detected. Such large-scale tests provide valuable experience to allow adjustments to be made before the Census Program itself is conducted. In other cases, however, new questions or methodologies can only be tested properly within the environment of the real-time Census Program activities, with its high level of public awareness and the scale of its operations. Statistics Canada often takes advantage of this opportunity; for example, centralized edit was first tested in the 1996 cycle and the Internet collection methodology in the 2001 cycle before being both rolled out nationally in 2006.

Census Program methodology often evolves only over several cycles. New methods may first be introduced in a limited way, and then expanded as experience with them is gained and improvements are made. Tests of mailing out questionnaires date as far back as the 1960s, but it was only by 2006 that the creation of an Address Register was cost effective and had reached a sufficient level of quality to be used to mail questionnaires. Automated coding of write-in responses was first used in a limited way in 1991, but was only extended to all write-in questions in 2006.

The same is true of content; for example, concepts such as head of household and marital status have changed along with society, and have seen gradual, but significant, changes.

Evaluating the results of each Census Program cycle in order to develop, test and implement new questions and new methodologies is an ongoing process that requires a long-term focus and commitment.

4. 2011 Census Program: introduction of the National Household Survey

4.1 Methodology

In the 2011 Census Program, all households received the same 2011 Census questionnaire. It consisted of the same eight questions (name, date of birth, sex, marital and common-law statuses, household relationships, mother tongue and the question seeking consent to release in 92 years their personal information to Library and Archives Canada) that appeared on the 2006 Census short-form questionnaire, plus two additional questions on language that had appeared on the 2006 Census long-form questionnaire. This 2011 Census questionnaire was the only form referred to as the 2011 Census in the 2011 Census Program and it remained mandatory to fill it out.

Instead of the census long form that was administered to 20% of the households on a mandatory basis in 2006, a new voluntary National Household Survey (NHS) was administered to 30% of the households. In addition to the same questions as the 2011 Census questionnaire, the NHS questionnaire included most of the same topics as the 2006 Census long form. Topics covered in the NHS were (in order of appearance on the questionnaire):

(1) Demography
(2) Activities of daily living
(3) Sociocultural information
- Citizenship and immigration
- Language
- Ethnic origin, population group
- Aboriginal identity, Registered or Treaty Indian status, member of a First Nation/Indian band
- Religion

(4) Mobility
(5) Place of birth of parents
(6) Education
(7) Labour market activities, including:
- Place of work and journey to work
- Work activity
- Language at work
- Child care

(8) Income
(9) Housing, including shelter costs
(10) 92-year consent

The design of the 2011 Census Program was based on testing and results from previous cycles, with a particular focus on mail and Internet response. Self-enumeration areas included 98.9% of the private dwellings in Canada. In 'mail-out-letter' areas (61.4% of private dwellings), Internet promotion letters providing only an individualized and secure Internet code and a toll-free number to request a paper questionnaire were mailed. In 'mail-out-questionnaire' areas, an additional 18.1% of private dwellings (for a total mail-out of 79.5%) received a questionnaire package that also included an individualized and secure Internet code. For private dwellings where mail-out was not possible (19.4%), enumerators listed the dwellings and delivered the questionnaire packages in person ('list/leave' areas). Again, the questionnaire packages contained an individualized and secure Internet code. The remaining 1.1% of private dwellings consisted primarily of reserves and remote areas where enumerators listed dwellings and conducted face-to-face interviews (called 'canvasser' areas).

This mail-out strategy relied extensively on Statistics Canada's Address Register, a frame of residential location-based addresses that also maintains mailing addresses (McClean and Charland 2011). To delineate the mail-out areas (for both the 2011 Census and NHS), the location address had to follow civic style addressing (i.e., it contains at least a civic number, a street name and a municipality) and Canada

Post Corporation (CPC) had to use the same civic style addressing for mail distribution. Small pockets of potential mail-out areas within otherwise non-mail-out areas were removed to ease the management of field collection operations.

To promote response while remaining cost-effective, a new 'wave' collection methodology was tested and put in place for 2011. Adjustments to the original plans were required to react to CPC disruptions and environmental events in certain parts of the country (e.g., forest fires). The wave collection methodology is summarized in the box below.

Wave collection methodology for the 2011 Census and NHS

On May 3 (i.e., seven days before Census Day), the Internet promotion letters or questionnaires for the 2011 Census were delivered by CPC in mail-out areas and questionnaires were dropped off by enumerators in list/leave areas. Between May 13 and 19, reminder letters were sent to census non-respondents. Between May 20 and 31, census non-respondents in the mail-out-letter areas received for the first time a questionnaire package, and on May 24, those in the mail-out-questionnaire areas received a telephone voice broadcast reminder when Statistics Canada had a phone number for them. All census non-respondents were subsequently moved to the non-response follow-up stage, performed by enumerators, which started on June 1 and ended on August 5 in all areas.

For the NHS, census Internet respondents who were in the NHS sample were offered the option to respond online to the NHS immediately after completion of their census questionnaire. Between June 6 and 9, these NHS households received a reminder letter if they had not yet completed the questionnaire. Between June 3 and 14, census paper questionnaire respondents in the NHS sample received for the first time their NHS paper questionnaire. Between June 13 and 16, these NHS households received a reminder letter if they had not yet completed the questionnaire. All NHS non-respondents (including census non-respondents selected in the NHS) were subsequently moved to the non-response follow-up, performed by enumerators, which started as early as June 8. On July 14, remaining NHS non-respondents were subsampled at 33% and only these were subsequently further followed-up. This follow-up ended on August 24 in all areas.

It is worth noting that the total duration of census collection activities was one month shorter in 2011 compared to 2006, and about two weeks shorter for the NHS compared to the census long form in 2006. In 2006, there were particular challenges in mobilizing the necessary workforce to perform all collection activities in certain parts of the country.

The move from the mandatory census long form in 2006 to the voluntary NHS in 2011 was expected to significantly impact the response rates. With lower response rates comes the risk of increasing the non-response bias. No tests to predict these impacts had ever been done on a survey in Canada that has both this magnitude and self-enumeration as the main collection mode. The only example was a test conducted in the Labour Force Survey (which is conducted by interviews, not self-enumeration) in late 1998 and early 1999 to assess the possible impact of a change from mandatory to voluntary status. The analysis was limited to those who refused to complete the survey. The refusal rate for the voluntary portion of the test was consistently about twice (around 3%) the rate of the mandatory portion (around 1.5%). The study also found that a voluntary survey could lead to significant differences in the national unemployment rate.

The closest experience internationally was a 2003 test of making response to the American Community Survey (ACS) in the United States voluntary. The ACS, which replaced the decennial census long form last conducted in 2000, is carried out continuously. For a given monthly sample, collection by mail is attempted the first month, followed by telephone follow-up the next month and finally by face-to-face interviews the third month but only for a subsample of the non-respondents. The voluntary test resulted in a drop of 20.8 percentage points in the mail cooperation rate and a drop of 13.3 percentage points in the telephone cooperation rate (Griffin and Raglin 2011). As a result, if the ACS were to become voluntary, more non-respondents would have to be moved to the telephone follow-up and more would reach the stage of face-to-face interviews, two collection modes that are more costly than mail. Griffin (2011) has estimated that an additional 66.5 million U.S. dollars (an increase of 48%) would be needed to preserve the same quality with a voluntary ACS. If the budget remained unchanged, the loss in quality (sampling variance) would be of the order of 45%.

To compensate for the loss of responses (increased sampling variance) and the potential increase in bias, three main actions were taken for the 2011 NHS. First, the sampling fraction was increased from 20% (about 2.5 million dwellings) for the 2006 Census long form to 30% (about 4.5 million dwellings) for the 2011 NHS. With an achieved response rate of 93.5% in the 2006 Census long form and an anticipated response rate of only 50% for the 2011 NHS, the sampling fraction increase was meant to achieve approximately the same effective sample size (and similar sampling variance), i.e., approximately the same number of responding dwellings. It is important to note that increasing the sample size does not prevent non-response bias; it only assures that dissemination of results in 2011 at very fine local areas would not be restricted, compared to 2006, due to lack of responding units in the sample.

Second, to address the issue of non-response bias, a random subsample of the remaining NHS non-respondents as of July 14 was selected, with particular attention given to areas likely to contain populations at risk of not responding or to be heterogeneous according to 2006 Census Program data. Additional efforts were made to follow up and obtain responses from this subsample. Subsampling and additional follow-up of non-respondents is a well-known technique in the survey methodology literature and was first proposed by Hansen and Hurwitz (1946). For example, as mentioned earlier, it is used by the ACS to subsample the non-respondents to be followed up by face-to-face interviews. The technique assumes that the extra efforts made to elicit responses for all units in the subsample (e.g., by moving from mail-out/mail-back collection to face-to-face interviews for the subsample) will result in responses being obtained from most of the subsample. In practice, however, there is no collection strategy that will ensure full response for the subsample. Statistics Canada's planning assumption was for a 75% response rate in the subsample.

Third, 2011 Census data are available for almost all households in Canada and this information can be used in weighting the NHS responding households. This method can reduce non-response bias in the NHS to the extent to which non-response in the NHS is correlated with the 2011 Census variables. In addition, there is a plan to further adjust for non-response using income tax information. It is unlikely, however, that all NHS non-response bias can be explained via these variables.

4.2 Preliminary results

As mentioned in Section 4.1, data collection ended in August for the 2011 Census and NHS. Because the quality of the census and NHS data has not been fully assessed, most of the findings presented here are preliminary. The evaluation of data quality will continue for many more months as Statistics Canada conducts the different evaluations which will lead to the release of the census and NHS information, beginning respectively in February 2012 and in 2013.

The following tables provide a comparison of the response rates for the 2011 Census and NHS to those of the 2006 Census. The response rates are as of August 24, 2011, for the 2011 Census and as of September 30, 2011, for the 2011 NHS, and as such are considered preliminary. They are obtained directly from collection results, i.e., before data processing and data quality verification. They are calculated as the number of private dwellings that returned a questionnaire divided by the number of private dwellings classified as occupied by field staff. For the NHS, the rate is calculated on the sampled private dwellings only. The 2006 response rates are the final ones, i.e., after data processing and data quality verification.

Table 2 Census response rates in 2006 and 2011

Provinces and territories	2006 Census final response rate (%)	2011 Census preliminary response rate (%)
Canada	**96.5**	**98.1**
Newfoundland and Labrador	97.3	98.2
Prince Edward Island	97.2	98.3
Nova Scotia	96.6	98.0
New Brunswick	97.6	97.7
Quebec	96.1	98.2
Ontario	97.1	98.3
Manitoba	97.3	97.8
Saskatchewan	97.1	97.8
Alberta	96.6	98.0
British Columbia	95.2	97.6
Yukon	97.0	94.1
Northwest Territories	97.5	96.6
Nunavut	98.4	92.7

Table 2 shows that the 2011 Census response rates are slightly better than those of the 2006 Census, except in the territories. However, these rates must be compared with great caution. First, as mentioned above, the 2006 rates are final as opposed to the 2011 ones. Second, these differences result from both substantial changes in the design of the census (e.g., moving from a combination of short and long forms in 2006 to a single short form in 2011) and improvement in data collection methods in 2011. More processing and analysis will be needed to get a better understanding of these differences.

Table 3 2011 National Household Survey (NHS) and 2006 Census long-form response rates

Provinces and territories	2006 Census long-form final response rate (%)	2011 NHS preliminary response rate (%)
Canada	**93.5**	**69.3**
Newfoundland and Labrador	94.3	64.0
Prince Edward Island	93.7	61.5
Nova Scotia	93.3	65.8
New Brunswick	95.1	64.5
Quebec	93.6	72.9
Ontario	94.3	68.1
Manitoba	95.5	68.8
Saskatchewan	95.1	64.5
Alberta	93.7	67.5
British Columbia	91.6	70.2
Yukon	96.0	61.1
Northwest Territories	97.6	83.9
Nunavut	93.8	78.1

Table 3 shows that the response rates from the 2011 NHS are much lower than those obtained during the 2006 Census with the long form. Once again, caution must be taken when comparing these rates. However, further adjustments to the 2011 rates are unlikely to significantly change these differences. It should be noted that the 69.3% response rate obtained in 2011 is much higher than the initial 50% rate expected during the planning of the survey.

Table 4 shows the return rates of census questionnaires obtained in 2006 and 2011. The return rate is equal to the number of questionnaires completed and returned by Canadian households, either by Internet or by mail using the paper questionnaire, divided by the number of occupied dwellings in parts of Canada where self-enumeration was planned.

Table 4 Internet or mail return rate of 2006 and 2011 Census questionnaires (self-enumerated regions only)

Provinces and territories	Return rate in 2006 (%)	Return rate in 2011 (%)
Canada	**80.7**	**85.2**
Newfoundland and Labrador	86.4	85.9
Prince Edward Island	84.8	86.1
Nova Scotia	83.0	86.1
New Brunswick	84.8	86.4
Quebec	80.8	85.4
Ontario	80.7	85.4
Manitoba	83.3	86.3
Saskatchewan	84.7	86.3
Alberta	78.9	83.1

Provinces and territories	Return rate in 2006 (%)	Return rate in 2011 (%)
British Columbia	78.5	84.8
Yukon	69.1	80.4
Northwest Territories	65.9	53.9

Note: No self-enumeration was planned for Nunavut. Collection was done solely with personal interviews conducted by enumerators.

In most provinces and territories, return rates for the 2011 Census are higher than those of the previous census. At this stage of the analysis, it is thought that the increase is the result of the new wave collection methodology, introduced with the 2011 Census Program.

When considering the return rate of 2011 Census questionnaires according to response mode, the rates obtained in 2011 are 53.7% for Internet and 31.5% for mail, with a total return rate of 85.2%, as shown in Table 4, whereas these rates were 18.3% and 62.4% respectively in 2006. The very large increase in Internet returns for the 2011 Census is mainly due to the mail-out, to more than 60% of Canadian private dwellings, of a letter with an Internet access code and instructions on how to obtain a paper questionnaire, while in 2006, dwellings had received a questionnaire with a return envelope.

Table 5 shows the distribution, by 2011 Census and NHS response mode, of households that completed the 2011 Census and were selected for the 2011 NHS. Households that did not complete the 2011 Census are excluded from this table.

Table 5 Distribution of households that completed the 2011 Census and were selected for the 2011 National Household Survey (NHS), by 2011 Census and NHS response mode

	2011 Census response modes		
2011 NHS response modes	Internet (%)	Mail (%)	Other response modes (%)
Internet	81.1	5.0	1.5
Mail	0.9	33.3	3.4
Other response modes	4.4	13.4	44.9
Non-response	13.7	48.2	50.2
Total	100.0	100.0	100.0

Note: This distribution is dated October 31, 2011, and is considered preliminary. It is provided for information purposes only.

The distribution analysis in Table 5 shows that 13.7% of households that completed the 2011 Census via Internet did not respond to the NHS, compared to 48.2% of those households that completed the 2011 Census by mail. Among households that completed the 2011 Census by Internet, 81.1% also completed the NHS by Internet. Overall, 64.2% (not shown in Table 5) of all households that responded to the NHS chose the Internet response mode.

It is important to remember that households that completed their 2011 Census questionnaire by Internet and were selected for the NHS were immediately offered to complete the NHS. This was not the case for households that returned their completed census questionnaire by mail; the NHS questionnaire was sent to them about four weeks later. This could suggest that an integrated census and NHS collection increases the NHS response rate. However, it is premature to conclude that more NHS questionnaires

would have been returned by mail if both questionnaires had been sent out at the same time, or even combined. More tests and analyses are required.

Another important measurement for the NHS is the weighted collection response rate. This rate takes into account the subsampling of NHS non-respondents, which was intended to minimize potential non-response bias. The weighted non-response represents the response rate that would have been achieved if follow-ups had been done for all non-responding NHS households instead of only a subsample of them.[19] According to initial analyses, the preliminary weighted response rate at the national level is slightly less than 80%. This rate is well below the 93.5% rate obtained with the 2006 long form. As mentioned in Section 4.1, Statistics Canada had hoped to obtain responses for 75% of the subsample of non-respondents, but in reality, this rate does not exceed 50% according to initial analyses.

That being said, a greater non-response does not automatically imply bias. Further assessments will have to be carried out, but preliminary analyses based on 2011 Census data showed no major differences between NHS respondents and non-respondents in terms of age or gender. Small differences were noted with regards to marital status (slightly fewer separated, divorced and widowed persons responded to the NHS) and mother tongue (slightly fewer persons whose mother tongue is English responded to the NHS).

Analysis of preliminary response rates (weighted and unweighted rates) also revealed that at provincial and census metropolitan area (CMA) levels, rates are quite similar and do not vary much. However, at a lower level, such as census subdivisions (i.e., municipalities as defined by provincial or territorial legislation), there are considerable variations for subdivisions with fewer than 10,000 dwellings. For some of them, response rates are lower than the national response rate. Variation increases for even smaller geographic units, such as subdivisions with fewer than 1,000 dwellings or dissemination areas. This was observed during the 2006 Census Program, but the extent of variation in response rates was much smaller than the extent observed with the 2011 NHS.

For households that chose to respond to the NHS, preliminary analysis of response rates to NHS questions seems to show that rates for the first modules of the NHS questionnaire up to the education module are not very different from the rates for the same modules in the 2006 long form. However, the differences are more important starting with the labour market activity module. The main reasons of the differences compared to 2006 could have to do with the absence of a follow-up for partial non-response to NHS questions and to the voluntary nature of the questionnaire, which may have had an impact on the perseverance of respondents.

4.3 Conclusions

In conclusion, for the 2011 Census, the preliminary response rate is generally higher than the 2006 final response rate. The questionnaire return rate is higher than that of 2006 by nearly five percentage points. The Internet completion rate of questionnaires is nearly three times higher than that of 2006. Finally, the total duration of collection operations was almost one month shorter compared to 2006.

19. In a perfect world, if we could obtain responses for all of the units in the non-respondent subsample, the weighted response rate would be 100%. The unweighted response rate would remain below 100%, because it would still take into account non-respondents who were not included in the subsample and who remain non-respondents.

As for the NHS, the preliminary response rate is approximately 25 percentage points below the final response rate for the 2006 long form. When considering the NHS sample design, the NHS weighted preliminary response rate allows us to reduce this gap by at most 10 points. Several methods are being developed and implemented to process and weight the NHS results in order to reduce the impact of non-response on estimates. An analysis of the effects of increased non-response on the quality of estimates is also underway.

Part B:
Census Program objectives and content needs

5. What is a census?

5.1 For the international statistical community

Merriam-Webster (2011) defines a census as "a usually complete enumeration of a population; *specifically*: a periodic governmental enumeration of population."

On the statistical scene, there are internationally recognized definitions, principles and recommendations for censuses of population and housing. These are issued by the United Nations (UN), through its United Nations Statistics Division, and its five regional commissions, including the United Nations Economic Commission for Europe (UNECE) of which Canada is a Member State.

The UNECE (2006, p. 6–7) defines a population census as "... the operation that produces at regular intervals the official counting (or benchmark) of the population in the territory of a country and in its smallest geographical sub-territories together with information on a selected number of demographic and social characteristics of the total population." A similar UNECE definition applies for a housing census, where the characteristics apply to the stock of housing units and its occupants. The population and housing censuses, when conducted at the same time, are also able to provide information on the living conditions of the population. For that reason, a census normally refers to a **census of population and housing**.

According to the UNECE (2006, p. 7–8), the essential features that distinguish a population and housing census from other data collection activities are the following:

- **Individual enumeration**: Information on each enumerated person (and housing unit) is obtained so that their characteristics can be separately recorded. This allows the data on the various characteristics to be cross-classified.
- **Simultaneity**: Information obtained on individuals and housing should refer to a well-defined reference period. Ideally, data on all individuals and living quarters should be collected simultaneously. However, if data are not collected simultaneously, adjustment should be made so that the final data have the same reference period.
- **Universality**: The population and housing census should provide data on the total number of persons, households and housing within a precisely defined territory of a country. The counting (or benchmarking) of the population should include every person residing in the defined territory of a country. The data provided by the census of the counting of the basic units should be validated with an independent coverage check.
- **Small area data**: The census should produce data on the number and characteristics of the population and housing related to the smallest geographic areas of the country, and to small population groups, consistent with protecting individual confidentiality.
- **Defined periodicity**: The census should be taken at regular intervals so that comparable information is made available in a fixed sequence.

The definition of a population and housing census is very much geared towards the output produced by the census. The production of outputs depends on the frequency of the census, its content, its methodology and the technology it uses. The first three of these elements are examined more closely below, from the perspective of the existing UN and UNECE international principles and recommendations. Taken together, they illustrate that, for the international statistical community, **the census is more than just a simple head count of the population**.

Frequency of the census

The United Nations recommends that all countries or areas of the world produce detailed population and housing statistics for small area domains at least once every 10 years, more particularly around the year 2010 for the period 2005 to 2014 (United Nations 2008, p. 1). The United Nations acknowledges that some countries may find it necessary to carry out a national census more frequently than every 10 years because of the rapidity of major changes in their population and/or its housing circumstances (United Nations 2008, p. 8).

Content of the census

The UNECE recommendations for the 2010 round of censuses of population and housing (UNECE 2006) provide detailed guidance on the topics that should be included in the census. Definitions and standards are provided on each topic, and the relevance and comparative advantage of each topic relative to other census topics and other data collection activities outside the census are described.

The list of topics is divided between core and non-core topics (UNECE 2006, p. 155–158). Core topics are those considered to be of basic interest and value to UNECE Member States and it is recommended that countries cover these topics in their population and housing census of the 2010 round. Non-core topics are those topics that countries could select based on their national priorities.

Core topics include:

- place of usual residence
- sex, age, legal marital status
- relationships between household members
- country/place of birth, country of citizenship, ever resided abroad and year of arrival in the country
- previous place of usual residence and date of arrival in the current place
- educational attainment
- current activity status, occupation, industry, status in employment, place of work
- tenure status of households
- housing arrangements, type and location of living quarters, occupancy status of conventional dwellings, type of ownership, number of occupants, useful floor space and/or number of rooms of housing units, water supply system, toilet and bathing facilities, type of heating, dwellings by type of building, dwellings by period of construction.

Census methods

The UNECE recognizes that there are different census-taking approaches, including the traditional census, the census using administrative registers and the census using continuous measurement. The UNECE does not recommend any specific approach; its aim is simply "... to present the different approaches with their advantages and disadvantages and guide countries to make the best choice that fits their national circumstances" (UNECE 2006, p. 3).

5.2 Country-specific legislation related to the definition of a census

This section examines how legislation in individual countries relates to the definition of a census, as understood by the international statistical community and summarized in Section 5.1, first in Canada (5.2.1) and second in other countries (5.2.2). Frequency, content and methods are again looked at more closely.

5.2.1 In Canada

Frequency of the census[20]

The first census in New France was conducted in 1666 under Jean Talon. A long string of censuses followed, often regional and at irregular intervals. On August 30, 1851, Royal Assent was given to a new law requiring regular censuses, starting in 1851 and continuing in 1861 and every tenth year thereafter. Thus, 1851 would appear to mark the beginning of Canada's decennial censuses.[21]

The constitutional requirement for a Census of Population in Canada dates back to the proclamation of *The British North America Act, 1867* (now known as the *Constitution Act, 1867*) when a decennial census was required in 1871 and every 10 years thereafter under section 8 of the Act.

The constitutional requirement for a quinquennial census came at a later stage. After 1867, legislation was passed to further regulate how certain amounts would be transferred from the federal government to the provinces based on population counts ascertained by the census. In the case of the Prairie provinces (Alberta, Saskatchewan and Manitoba), with their expected fast expansion and growing population, the population counts were to be ascertained by a quinquennial census until the populations of these provinces reached a certain limit. Quinquennial censuses thus started being conducted in the Prairies in 1906. Such a population requirement for a quinquennial census still exists today as the limits set out were 1.5 million and 1.2 million persons, respectively in the *Constitution Act, 1907* and the *Constitution Act, 1930*. Based on the 2011 Census, the population counts were 1,208,268 for Manitoba, 1,033,381 for Saskatchewan and 3,645,257 for Alberta, placing Manitoba and Saskatchewan below the specified thresholds.

The requirement for a nationwide quinquennial census has been part of the *Statistics Act* since 1970. Section 19 of the Act stipulates that "a census of population of Canada shall be taken by Statistics Canada in the month of June in the year 1971, and every fifth year thereafter in a month to be fixed by the Governor in Council." However, the first nationwide quinquennial census was in 1956. Pryor (1992), quoting an administrative report prepared for the 1956 Census, said:

> The decision to replace the quinquennial censuses of Manitoba, Saskatchewan and Alberta by a nationwide census of modified design in 1956, was influenced by the extremely large increases and shifts in population shown by inter-censal estimates since 1951, and by the rapid changes occurring in the agricultural economy of the country....
>
> Such rapid developments in population and agriculture indicated the need for bench marks at the five-year period in order to provide a more accurate basis for annual estimates. Further, one of the chief values of the 1956 Census, both for population and agriculture, is that it provided information for small areas, (counties, municipalities, cities, towns, etc.) which cannot be obtained from inter-censal estimates.

20. Given that legislation is the topic of this section, when census is mentioned, it refers to the collection activity in Canada labelled as census, unless otherwise specified. The 2011 Census, and not the 2011 NHS, is the 'census' in the 2011 Census Program. In the 2006 Census Program, both the short and long forms were labelled 'census.'
21. Decennial censuses in Canada are defined as those conducted in years ending in '1,' whereas quinquennial censuses refer to those conducted in years ending in '6.'

Content of the census

The current *Statistics Act* does not outline which questions are to be asked in the census and what the content should be. Section 19 of the Act refers to the census as a census of population and as one that is taken in a manner that ensures that counts of the population are provided for each federal electoral district of Canada. Section 21 of the Act stipulates that the questions to be asked in the census are approved by the Governor in Council, and requires that an order in council be made and that it be published in the Canada Gazette.

Although the *Statistics Act* also does not define the term 'population,' the term is used in section 22 of the Act, which provides a list of matters in relation to which the Chief Statistician shall compile statistics. The term 'population' is listed as the first topic, followed by others such as health and welfare, immigration and emigration, education, labour and employment, prices and the cost of living. Many of these topics have been included in recent censuses prior to 2011.[22]

Earlier versions of the *Statistics Act* provided more details on the content of the census. For example, section 19 of the *Statistics Act* of 1918 and 1948 stated that the Census of Population was to be taken to ascertain topics such as age, sex, conjugal condition, relation to head of household, nationality, race, education, wage earnings, religion, occupation, number of houses for habitation and number of rooms inhabited, as well as such other matters as may be prescribed by the Governor in Council. In 1953, the *Statistics Act* was amended and section 19 became less precise but still stated that the census was to ascertain the following:

(a) the population
(b) the number of houses for habitation
(c) the number of farms
(d) such characteristics of the subjects described in paragraphs (a), (b) and (c) as may be prescribed by the Governor in Council
(e) such other matters as may be prescribed by the Governor in Council.

It appears such changes made to the *Statistics Act* around the specificity of the census content were made to gain flexibility to respond to needs of a changing society, while ensuring that there remained a formal process to approve content. This seems to be confirmed by a House of Commons transcript dated March 30, 1953. The Parliamentary Assistant for the Minister of Trade and Commerce, Mr. G. J. McIlraith, stated that:

> Under the present section [meaning the 1948 Act] the provisions are absolutely rigid, so that it is necessary for the bureau to include in the census questionnaires information it may already have. The modified language in section 4 [refers to the 1953 proposed amendments] permits more flexibility, and should result in the cutting down of questions on census forms.

In practice, the content included in the Census Program in Canada has continued to reflect the view that the Census of Population is more than a simple count of the population and that it is meant to also describe that population. Similarly, the census has not been simply one of individuals, but also one of housing.

22. The 2011 Census Program did include many of these topics as well, but they were included in the NHS, which was not labelled as 'census' in 2011. See Section 4.1 for more detail.

It could be argued that the wording used in the present *Statistics Act* limits the Census of Population questions to those that relate only to the topic of population. If the need for other questions is demonstrated, the census questionnaire (or Census Program) could include questions other than those related to population, and which could be mandatory or voluntary. Such questions could be collected with the census, as long as the questions on those topics are authorized by the Minister pursuant to sections 7 and 8, an authority which is normally delegated to the Chief Statistician. This is not precluded in the *Statistics Act*.

Census methods

The methodology of the census per se is not specified in the *Statistics Act*. This being said, the *Statistics Act* stipulates in section 9(2) that the Minister may authorize the use of sampling methods for the collection of statistics. Section 13 gives Statistics Canada access to administrative data for statistical purposes. It appears that the *Statistics Act* would not prohibit the census from using either sampling methods or administrative data.

5.2.2 In other countries

Frequency of the census

The frequency of the census is generally specified in the legislation of other countries as well. For example, both Australia and New Zealand have legislation requiring the conduct of censuses every five years like in Canada. In New Zealand, section 23(1) of the *Statistics Act, 1975* stipulates that a census of population and dwellings shall be taken in 2013 and in every fifth year thereafter.[23] In Australia, section 8 of the *Census and Statistics Act, 1905* has required a census to be carried every five years since 1981, although in practice, censuses have been conducted every five years since 1961.

In the United Kingdom, legislation offers some flexibility around the frequency. Section 1 of their *Census Act, 1920* prescribes a census no more frequently than every five years. In practice, the United Kingdom has carried out a census every 10 years since 1801 with a few exceptions (e.g., there was no census in 1941 due to World War II).

In the United States, the prescription of a decennial census is embedded in the *Constitution of the United States*. Section 2 of Article 1 stipulates that an 'actual enumeration' is to be conducted every 10 years. Title 13 of the United States Code governs how the census is conducted and how its data are handled. Section 141(d) allows for a mid-decade census, but "... taking into account the extent to which information to be obtained from such census will serve in lieu of information collected annually or less frequently in surveys or other statistical studies." In 1985, the U.S. Congress authorized a mid-decade census, but funds were not appropriated and it was never conducted (U.S. Census Bureau, 2009, p. 2-1).

France is a country where there was no legal requirement to conduct a census at specific points in time. This resulted in censuses being conducted at irregular intervals ranging between six to nine years, from 1946 to 1999. The French census planned for 1997 was postponed to 1999 because the funding could not be secured (Godinot 2005, Chapter A.3). The situation changed only 10 years ago, with the passing of the *Loi relative à la démocratie de proximité* on February 27, 2002.

23. The Act has required that a census be conducted every five years since 1976, but the Act was amended on August 30, 2011, further to the February 2011 Christchurch earthquake that forced the census scheduled for March 8, 2011 to be postponed to 2013.

Content of the census

In Australia, the evolution of the legislative prescription of census content has been similar to that of Canada. The *Census and Statistics Act, 1905* originally stipulated a number of topics that were to be asked in each census, including name, age, sex, relationship, marital status, duration of marriage, birthplace, nationality, period of residence, religion, occupation, material of outer walls and number of rooms in the dwellings. It also allowed for other topics to be included as prescribed. In contrast, the currsent section 8(3) of the Act states only that "the Statistician shall collect statistical information in relation to the matters prescribed," with such a prescription arising from Census Regulations (Australian Bureau of Statistics 2011).

Other countries have more detailed legislative provisions with regard to the content of the census. In New Zealand, the census is explicitly referred to as a census of population and dwellings in section 23(1) of the *Statistics Act, 1975*, and section 24 mentions 'the particulars to be collected' (name, sex, address and ethnic origin of every occupant of the dwelling, as well as particulars of the dwelling as to location, number of rooms, ownership, and number of occupants) and the particulars that the Statistician may obtain if he considers it in the public interest to do so (topics are numerous, including labour market activity, place of work, work activity, income and housing).

In the European Union (EU), EU legislation (European Union 2011) clearly refers to population and housing censuses. The EU legislation recognizes that the EU Member States have developed different methods to produce census data that each country considers to be best suited to its particular administrative practices and traditions. The Regulation of the European Parliament and of the Council on population and housing censuses (Regulation (EC) No 763/2008) is concerned with output harmonisation rather than input harmonisation. Regulation (EC) No 1201/2009 contains definitions and technical specifications for the census topics (variables) and their breakdowns that are required to achieve Europe-wide comparability. The census topics include geographic, demographic, economic and educational characteristics of persons, international and internal migration characteristics, as well as household, family and housing characteristics. Regulation (EU) No 519/2010 requires the data output that Member States transmit to comply with a defined program of statistical data (tabulation) and with set rules concerning the replacement of statistical data. The statistical data must be completed by metadata to facilitate their interpretation. Regulation (EU) No 1151/2010 requires transmission of quality reports containing a systematic description of the data sources used for census purposes and of the quality of the census results produced from these sources.

Like the EU legislation, specificity around content is also part of some Member States' legislation. For example, section 156 (II) of the French *Loi relative à la démocratie de proximité* states that the purpose of the census is to enumerate the population of France and to describe its demographic and social characteristics, and to count the dwellings and describe their characteristics. In the United Kingdom, Schedule 1 of the *Census Act, 1920* specifies the 'matters in respect of which particulars may be required,' which include, among others, names, sex, age, occupation, nationality, birthplace, race, language, place of abode and character of the dwelling.

In the United States, section 141(g) of Title 13 of the U.S. Code says that "a census of population means a census of population, housing, and matters relating to population and housing." Section 141(f) states how the Secretary of Commerce shall submit census subjects and questions "... to the committees of Congress having legislative jurisdiction over the census."

Census methods

At a first glance, it may appear that little guidance on the methods to be used is provided in the legislation of the countries that conduct a traditional census (see Section 7.1 for a definition). However, the choice of words and the interpretation are often key in determining how legislative intent translates into census methodology. For example, Article 1, section 2 of the *Constitution of the United States* calls for an 'actual enumeration' (i.e., an actual headcount) of the people every 10 years, to be used for apportionment of seats in the House of Representatives among the States. Section 195 of Title 13 of the United States Code further adds that sampling is authorized but not "... for the determination of population for purposes of apportionment of Representatives in Congress among the several States...."

In New Zealand, it appears that the census has to be based on a full enumeration. Section 24 of the *Statistics Act, 1975* mentions that the particulars to be collected (discussed earlier in this section) at every census of population and dwellings "... shall be obtained from every occupier or person in charge of a dwelling," thus requiring a full enumeration. This seems to be despite section 8 of the Act that allows the use of sampling for the collection of official statistics in place of a full enumeration when it is considered appropriate and section 22 of the Act that pertains specifically to the census of population and dwellings and confirms that other parts of the Act apply to that census.

In countries that have adopted a non-traditional census approach, the legislation is generally more prescriptive concerning census methods. In France, section 156 (VI) of the *Loi relative à la démocratie de proximité* states that communes under 10,000 people are subject to a census (full enumeration) each five years on a rotating basis and other communes are subject to a sample survey. Section 156 (VII) adds that some administrative data are used in combination with the censuses and sample surveys to produce the population counts.

Countries that conduct a census employing existing administrative registers (see Section 7.2 for a definition) have very detailed legislation. Chapter 5 of the *Statistics Netherlands Act*, for example, includes numerous sections relating to the acquisition, use and provision of administrative data. The legislation provides the authority to access and obtain administrative data and provide safeguards to protect that information once obtained. Of additional interest is section 34 of the Act that allows the use of tax and social insurance numbers for that purpose and sections 43 and 52 that make provisions for fines if the data are not provided when requested.

Norway is another such example. Of particular interest is section 3-2 of the *Act relating to official statistics and Statistics Norway* that states that "when state bodies or nationwide municipal organizations are to establish or modify a major administrative data-processing system, notice thereof shall be sent in advance to Statistics Norway. Statistics Norway may seek additional information. Statistics Norway may also put forward proposals concerning the manner in which data-processing systems should be designed in order to safeguard consideration for statistics."

Austria conducted its first census employing existing administrative registers in 2011. The legal basis was the *Register-based Census Act* of March 16, 2006, which in particular defines all sources of administrative data that have to be made available to Statistics Austria for that purpose (Lenk 2008). The *Register-based Census Act* also stipulates that the owners of the various registers deliver their data in encrypted form to Statistics Austria, with the person-related data like names and social security number replaced by an artificial identifier, bPK-AS (Hackl 2009).

6. Census Program data uses and users in Canada

Statistics Canada's mandate is to ensure that Canadians have access to a trusted source of statistics that meet their highest priority information needs. As mentioned in Statistics Canada's *Report on Plans and Priorities 2011-12* (Statistics Canada 2011a), the efficient production of relevant, accessible, high-quality statistics helps to ensure that our economy functions efficiently and that our society is governed effectively.

The Census Program contributes to Statistics Canada's mandate in two ways. First, it produces high priority information for many data users. To have a better understanding of what these high priority information needs for the 2016 Census Program are likely to be, discussions with data users[24] were undertaken in the summer and fall of 2011 as part of the 2016 Census Strategy Project. The process is briefly described in 6.1. Examples of key data uses are presented in 6.2.

Second, the Census Program is the foundation of many social statistics programs, and some economic statistics programs, that in turn contribute to Statistics Canada's mandate. This is illustrated by a few examples in Section 6.3 that are based on internal discussions conducted at Statistics Canada in the fall of 2011.

6.1 Discussions in the summer and fall of 2011

Representatives from all levels of government were contacted in the summer of 2011 to gain a better understanding of the role of Census Program[25] data in their operations and the impact if these data were not available. Others in the private and non-profit sectors were also contacted in the summer and fall of 2011, including national Aboriginal organizations, organizations representing official language minority communities, selected secondary data distributors, associations representing the business and non-profit sectors, direct end-users in these sectors, as well as various associations representing sectors of the population which are the focus of government policy.

A web-based tool was used to structure the feedback. Because of time constraints for obtaining feedback and because this discussion did not extend to all possible data users and was limited to information needs at the topic level (see Section 4.1) rather than at the question level, no prioritized list of topics is being shown here. Nonetheless, over 800 uses of Census Program data were reported to Statistics Canada by over 60 responding organizations. The examples of uses presented in 6.2 are only a fraction of the data uses reported. More can be found in Statistics Canada (2012).

24. Three of the duties of Statistics Canada, as outlined in the *Statistics Act,* are tied to the role of the organization in the context of a national statistical system. The requirement of Statistics Canada "to collaborate with departments of government in the collection, compilation and publication of statistical information, including statistics derived from the activities of those departments; ... to promote the avoidance of duplication in the information collected by departments of government; and generally, to promote and develop integrated social and economic statistics pertaining to the whole of Canada and to each of the provinces thereof and to coordinate plans for the integration of those statistics" means that when Statistics Canada engages Census Program data users, it must go beyond the federal government to include the broadest range of users.
25. The discussion held in 2011 specifically referred to census and NHS data. As mentioned earlier in this report, census and NHS are referred to as Census Program in this report.

6.2 Examples of Census Program data uses

Population counts are required explicitly by numerous pieces of federal legislation and are also associated with the population estimates produced at Statistics Canada by the Population Estimates Program (PEP) [also discussed in Section 6.3] and used, as part of the funding formula, to determine the distribution of major federal transfers[26] to the provinces and territories under the *Federal-Provincial Fiscal Arrangements Act*. It is critical that these population estimates, and the census population counts as input, be highly accurate as these transfers accounted for $57.7 billion in 2011/2012 and were estimated to account for about 19% of provincial and territorial revenues in that year (Department of Finance Canada 2012). The PEP is also a source of information for the allocation of House of Commons seats to provinces in the recent *Fair Representation Act* that received Royal Assent on December 16, 2011. Thus, questions that are required to produce high quality population counts from the census are the highest priority and as such, have always been asked of 100% of the population on a mandatory basis (Royce 2011, p. 48).

The official languages content is an example where there is an explicit legislative requirement for the use of census data for specific language variables where it is stated in subparagraph 3(a)(ii) that the method of estimating the "English or French linguistic minority population" is on the basis of "after the results of the 1991 census of population are published, the most recent decennial census of population for which results are published..." (*Official Languages (Communications with and Services to the Public) Regulations*, SOR/92-48). High quality data are needed, but in the context of a traditional census, sufficient quality has been obtained in the past by asking the question of a sample.

This process confirmed that for all topics in the 2011 Census Program, there continues to be requirements for information on small populations where there are no alternative sources, and for which the information serves a purpose with high importance. For example, Human Resources and Skills Development Canada, the Public Service Commission and Treasury Board Secretariat reported that *Employment Equity Regulations* require data on Aboriginal peoples and visible minorities which are not available in administrative databases but are provided by the Census Program.

Canada Mortgage and Housing Corporation indicated that they require housing information at a small area level of geography and for small populations, such as persons with disabilities and Aboriginal peoples living off reserve, to measure core housing need. The Regional Information Systems Working Group, which is comprised of professional planners concerned with data, systems and research issues primarily directed to land use planning, forecasting and municipal decision-making functions in the province of Ontario, stated that Census Program housing data are essential for the preparation of municipal official plans and for programs related to housing and homelessness.

The Government of Ontario stated that they use Census Program labour market information to support economic development initiatives such as the Canada-Ontario Labour Market Agreement Annual Plan, Employment Ontario Policy Framework and Ontario Job Futures occupational profiles. Data are used to identify client groups and communities in need of labour market programming, including sub-groups such as recent immigrants, youth and older workers, as well as to profile occupations in local labour markets. The Government of Alberta draws on Census Program data for many uses, including the determination of per capita funding under the *Municipal Government Act* and for input to the Labour Market Information reports which support understanding of the needs of Albertans. The Government of Saskatchewan uses

26. These include the Canada Health Transfer, Canada Social Transfer, equalization and Territorial Formula Financing.

Census Program data to identify the size of specific populations in support of uses such as *The Multiculturalism Act*, advance gender equality/status of women, and disability policy.

The Public Health Agency of Canada (PHAC) uses Census Program data as a denominator to calculate rates of disease among different populations and to describe subpopulations and/or socioeconomic factors and conditions that influence vulnerability to various diseases (e.g., sexually transmitted infections, tuberculosis and viral hepatitis). Census Program data are also used by PHAC to design interventions for these populations, to create documents for public health professionals, and to determine sampling frameworks for research initiatives, work which is critical to the prevention and control of these diseases.

Census Program data on place of work/travel to work are used by Transport Canada for transportation policy development and planning, and by the Transportation Association of Canada to determine travel demand forecasts for urban areas and to examine and forecast the spatial distribution of employment. The Government of Ontario reported that the NHS is the only source of consistent data across the province that provides place of work and place of residence linkages, commuting patterns and distances, and occupation details, which are critical for performance reports, program monitoring and evaluation, modelling, and geography distributions.

Non-government data users also identified important uses of Census Program data. For example, Census Program data are used by companies for retail site location, market segmentation and human resource planning. Pitney Bowes reported that over the last five years, their customers have relied upon their Statistics Canada-based datasets to direct their investment in billions of dollars in newly built retail outlets. Environics Analytics has developed market segmentation products to help businesses, governments and not-for-profit organizations improve their ability to segment, target and locate customers. The Marketing Research and Intelligence Association noted the importance of Census Program information on the workforce, especially detailed information on occupation and field of study, in developing human resource plans. The association also reported that the Census Program is the only source of reliable information on these topics.

The United Way of Greater Toronto reported using Census Program data for priority setting and strategic planning. Imagine Canada, a national charitable organization whose cause is to support and strengthen Canada's charities and non-profit organizations so that they can in turn support the Canadians and communities they serve, does policy development, research and marketing using Census Program information. National Aboriginal organizations, as well as the First Nations Statistical Institute, use Census Program data for resource allocation, program planning and policy development. The Quebec Community Groups Network uses Census Program information to support the work of the community sector serving the linguistic minority community, including helping other partners to understand who they are, their differences and what can be done to enhance the vitality of Canada's English linguistic minority communities. The Fédération des communautés francophones et acadienne (FCFA)[27] has said, among other things, that the use of census data is for the enforcement of the regulation in Part IV of the *Official Languages Act*. NHS data will be used to measure the vitality of communities and identify the positive results of programs and services in communities, as well as weaknesses regarding the development of communities, in order to influence the development and implementation of public policies to promote this community development and growth.

27. The mission of the FCFA is to serve as an active, involved and inclusive voice for Canada's Francophone and Acadian communities at the national level. The organization is committed to promoting linguistic duality, supporting the ability of Canadians everywhere to live in French, and fostering the full participation of French-speaking citizens to Canada's development.

Researchers are also major users of Census Program data. For example, between July 2007 and December 2010, 203 research projects using Census Program data were undertaken by university, federal or provincial government researchers at Statistics Canada's research data centres (RDCs).[28]

These are only a few illustrations of the uses of Census Program data that came out of the feedback in the summer and fall of 2011, and from analysis of the research undertaken in the RDCs. They demonstrate the extent to which Census Program data are integrated into government planning and programs, as well as the use of this information in non-government activities.

6.3 The Census Program as the foundation of the broader social statistics system

The United Nations (2008, p. 2) identifies the population and housing census as one of the pillars for data collection on the number and characteristics of the population of a country. The population and housing census is part of an integrated national statistical system, which may include other censuses (for example, agriculture), surveys, registers and administrative files. It provides, at regular intervals, the benchmark for population counts at national and local levels. For many countries, the census also provides a solid framework to develop sampling frames.

The Canadian Census Program plays this important role in Canada and its usage even extends to the economic statistics program. First and foremost, it is at the heart of the Population Estimates Program (PEP) that relies on the most recent Census Program data collected by Statistics Canada and administrative data provided by other federal, provincial and territorial government departments to produce estimates of the Canadian population between censuses. The PEP responds to statutory requirements for the calculation of revenue transfers and cost-sharing programs between the various levels of government (Statistics Canada 2011b). It produces information used in the *Federal-Provincial Fiscal Arrangements Act*. This information is used as part of the calculation of major transfers from the federal government to the provinces and territories. The PEP is also used as a source of benchmarks for many other social and household surveys at Statistics Canada and as such, it contributes to the integrity of the broader social statistics system. Moreover, such surveys, like the Labour Force Survey or the Survey of Household Spending, serve also the economic statistics program in estimating respectively quarterly labour income or annual household expenditures on goods and services.

Second, the Census Program data are used in a variety of ways for social and household surveys at Statistics Canada. They can be used to identify households or individuals with specific characteristics to build a sampling frame for other surveys, in particular for surveys on rare populations. An example of this is the Aboriginal Peoples Survey that is conducted as a postcensal survey in 2011.

In Canada, the Census of Agriculture is conducted at the same time as the Census Program. The Census of Agriculture relies on the Census Program to improve its coverage. The 2011 Census of Population included a question asking if anyone listed on the 2011 Census was a farm operator producing at least one agricultural product. In the 2011 Census of Agriculture, about 45,000 potential operations were identified through that question, resulting in approximately 15,000 new farms being added to the Census of Agriculture and ultimately to the agriculture survey frame used by other agricultural surveys. Without this, the Census of Agriculture coverage would have been reduced by 5 to 10%.

28. Census Program microdata files were added to the RDC data holdings for the first time in 2007.

The Census Program data can be used to improve the quality and efficiency of other surveys by being used at the design stage of the survey or after data collection to help in the treatment of non-response. For example, the Labour Force Survey (LFS) and the Canadian Community Health Survey (CCHS) are among the surveys at Statistics Canada that use the Census Program data in order to improve their stratification. In the last redesign of the LFS introduced in 2004, the LFS used the 2001 Census Program data to create strata with higher proportions of immigrants, Aboriginal and high-income households, and then oversampled in these strata to ensure that there would be enough sample in each of these subpopulations to produce more reliable estimates for them (Statistics Canada 2008a, p. 18–19).

The Census Program data are also used in the economic statistics program. For example, data on housing are used in the calculation of imputed rent, a component of the income-based gross domestic product (GDP). The place of work/journey to work information is used to estimate the flow of labour income between provinces and territories for the provincial and territorial estimates of GDP. The basic demographic, education and labour market information are used as an input into the estimation of investment in software and research and development. While these series do not represent a large share of GDP, they are significant in terms of business investment, competitiveness and understanding trends in productivity. This Census Program information figures prominently in helping develop the detailed labour productivity statistics and multi-factor productivity estimates.

Part C:
Methodology of the Census Program in response to objectives and content needs

7. Possible methodological approaches within the Canadian context for 2016

From January to June 2011, Don Royce was retained by Statistics Canada as an advisor to conduct a review of census-taking approaches that exist around the world. His report (Royce 2011) drew on international literature and experiences (see, for example, UNECE [2006] and UNECE [2007]), and described the strengths and weaknesses of each approach. Very importantly, his report also presented the necessary conditions for using each approach and assessed in detail whether these conditions are present in Canada or are likely to be present in time for the 2016 Census Program cycle.

Statistics Canada also developed an assessment framework for the 2016 Census Strategy Project (Trépanier 2011). The first step of the assessment was to identify approaches that are feasible for 2016 and others that could be envisioned only for 2021 and beyond. The results of this assessment for 2016 are presented in this section, and are used as a basis for discussion of conclusions for 2016 in Section 9. As the directions for 2016 are transformed into more concrete and detailed options, they should be further assessed on dimensions of relevance, quality, stewardship and risks that are encompassed in the second step of the assessment framework.

As in the report by Royce, this section briefly describes the three general census-taking approaches, namely the traditional census, the census employing existing administrative registers and the census employing continuous measurement, and examines the necessary conditions for implementing each approach. It adds the findings from other studies subsequently conducted by Statistics Canada to the initial assessment by Royce on the state of these conditions in Canada. More details on census-taking approaches around the world with examples from specific countries are available in Royce (2011).

7.1 Traditional census

The traditional census approach collects basic characteristics from all individuals and housing units (full enumeration) at a specific point in time. More detailed characteristics can be collected either from the whole population or on a sample basis. Collection modes may include personal interviews (canvasser approach), self-completed paper questionnaires, telephone (computer-assisted or not) and Internet. Some data might be replaced by administrative data to ease respondent burden and/or improve quality. The traditional census approach is the one used by the Canadian Census Program.

Royce (2011, p. 33–36) listed and assessed the following necessary conditions for the traditional census approach. Statistics Canada summarizes this initial assessment and complements it by other information that was gathered through different studies.

There must be a high level of awareness and cooperation by the public to participate in the census.
Royce's conclusion: Up to 2006, the public cooperation with the Canadian Census Program was excellent. The 2006 Census long-form questionnaire achieved a final response rate of 93.5%. The 2011 Census and NHS response rates must be examined. Several countries have cited declining participation rates in their censuses and surveys.
Statistics Canada's assessment: Section 4.2 reported a preliminary response rate of 98.1% to the 2011 Census and of 69.3% for the 2011 voluntary NHS. In 2006, the final response rates were 96.5% for the census, 93.5% for the mandatory long-form questionnaire in particular. The mandatory census achieved the same level of cooperation by the public in 2011 as in 2006 but the voluntary NHS did not. The Census Program is the only large-scale data collection exercise in Canada relying heavily on self-enumeration. While it is difficult to find comparable surveys to the Census Program in Canada, the 2011 response rates are not surprising. Response rates to the mandatory Labour Force Survey are of the order of 90% (Statistics Canada 2011c, p. 22). Response rates for voluntary surveys vary; they can be as low as 55% and are unlikely to surpass 80%. A voluntary survey relying on self-enumeration will almost certainly never achieve the same level of cooperation as a mandatory survey. The results of the 2003 test, by the U.S. Census Bureau, of a voluntary ACS also support this statement (see Section 4.1). Of concern as well is that cooperation with a voluntary survey may be unevenly spread within the population, leading to non-response bias that may be difficult to fully correct. Further information on this will only become available as the NHS data are processed and analyzed.

There must be a geographic infrastructure for the census, such as a set of maps (if questionnaires are distributed by or completed by enumerators) and/or a list of addresses (if questionnaires are mailed out), that permits the geocoding of all questionnaires to very small geographic areas.
Royce's conclusion: The necessary geographic infrastructure is in place. Statistics Canada maintains an Address Register (AR) that was used to mail out Internet promotion letters or questionnaires to 79.5% of the private dwellings in 2011.
Statistics Canada's assessment: The necessary geographic infrastructure is in place and has even allowed collection to be more cost-effective through the use of the AR for the Census Program mail-out. McClean and Charland (2011) reported that the census mail-out went from approximately two-thirds of the private dwellings in 2006 to 79.5% in 2011. An evaluation is being performed to assess the quality of the mailing addresses used for 2011. Work continues to further improve the AR, including targeted field verification and the use of administrative sources.

There must be a stable political and socially secure environment in the country, both to encourage public participation and to provide safe conditions for enumerators.
Royce's conclusion: The necessary environment is in place.
Statistics Canada's assessment: The necessary environment is in place. Statistics Canada does not foresee reasons why this would change for 2016.

If self-completion is used, there must be a relatively high level of literacy in the population.
Royce's conclusion: There is the necessary level of literacy in the population to have made self-completion the primary mode of enumeration in Canada. For population groups where language or literacy barriers exist, the Census Program has adjusted its collection methods, for example, by using the canvasser method or by translating the questionnaire into other ethnic and Aboriginal languages. The questionnaire is also available in braille, audio and signed video.
Statistics Canada's assessment: Statistics Canada agrees with this conclusion.

The country must have the legal and administrative framework and the resources, both human and financial, to undertake a traditional census.
Royce's conclusion: Canada has the legal and administrative framework and the resources to undertake a traditional census. There is a constitutional requirement to conduct both the decennial and quinquennial censuses and that requirement is also in the *Statistics Act*. Statistics Canada is charged with conducting the census and is allocated the financial resources to do so.

Statistics Canada's assessment:

As discussed in Section 5.2.1, the constitutional requirement for a decennial (years ending in '1') Census of Population in Canada dates back to the proclamation of *The British North America Act, 1867* (now known as the *Constitution Act, 1867*). The constitutional requirement for a quinquennial (years ending in '6') census still stems today from the *Constitution Act, 1907* and the *Constitution Act, 1930* as the population counts for Manitoba and Saskatchewan are still below the limits set by these enactments. The requirement for a nationwide quinquennial census has been part of the *Statistics Act* since 1970. Subsection 3(c) of the *Statistics Act* provides that a duty of Statistics Canada is to take the census of population of Canada.

There is an internationally recognized definition of what a census (or Census Program) is (see Section 5.1). The United Nations (2008) issues principles and recommendations for population and housing censuses. In contrast to this international understanding of what a census is and what appears in legislation of other countries (see Section 5.2.2), the *Statistics Act* is less prescriptive regarding the definition of a census (see Section 5.2.1). It does not specifically define the word 'census' and does not specify which questions are to be included in the census. It states that the census is a census of the population (or census of agriculture) and that the census of population is to be taken in a manner that ensures that counts of the population are provided for each federal electoral district of Canada. Section 21 of the Act provides the power to the Governor in Council to establish the census questions, and these questions can only be mandatory as per section 8 of the Act. The *Statistics Act* does not preclude the possibility of other questions, mandatory or voluntary, being collected with the census, as long as 1) such questions are authorized by the Minister pursuant to sections 7 and 8 of the Act (an authority which is normally delegated to the Chief Statistician); 2) it is clear that such questions are not census questions; and 3) it is clear which questions are mandatory and which are voluntary.

At this point, all indications are that Canada has the resources to undertake a traditional census approach.

Summary

Canada continues to meet the necessary conditions to conduct a traditional census approach. Statistics Canada must consider, however, the implications of collecting information on a voluntary basis rather than a mandatory basis, particularly for estimates for low geographic areas and small population groups, since the former does not achieve the same type of cooperation from the public. This will be further addressed in Section 8.

Statistics Canada will have to determine which questions need to be asked at the time of the census, and to identify among these, as per the provisions in the *Statistics Act*, which questions are Census of Population questions, and thus mandatory, and which questions are not census questions, which may be either mandatory or voluntary. The appropriate path for approval will have to be followed; census questions will be approved by the Governor in Council as per section 21 of the Act, and non-census questions will be prescribed by the Minister under section 7 and, for those that are voluntary, also under section 8.

7.2 Census employing existing administrative registers

The census approach employing existing administrative registers[29] relies at a minimum on a population register and a building/dwelling register to produce basic characteristics on all individuals and housing units at a specific reference point in time. More detailed characteristics can be obtained by linking to other existing administrative registers or administrative data sources (e.g., on education and employment) or by conducting surveys, either by complete enumeration or by sample.

Royce (2011, p. 36–41) listed and assessed the following necessary conditions for the census approach employing existing administrative registers. Statistics Canada summarizes this initial assessment and complements it by other information that was gathered through different studies.

There must be a legal basis giving the statistical agency the right to access administrative data at the unit level and to use identification numbers to link various administrative data sources together for statistical purposes.
Royce's conclusion: The legislative framework is incomplete. Section 13 of the *Statistics Act* gives Statistics Canada the right to access records held in any department or municipal office, corporation, business or organization for the purposes of the Act. However, in practice, Statistics Canada negotiates access to administrative data with each organization on a case-by-case basis. In many instances, other organizations are subject to laws that prohibit or limit the sharing of data under their control. There is no explicit mention of record linkage in the *Statistics Act* itself. Statistics Canada has however a *Policy on record linkage*. In a situation where administrative registers would be combined with complete enumeration or survey collection, Statistics Canada's *Policy on informing survey respondents* would require that respondents be notified at the time of survey collection of any planned linkages of their survey responses to other data files, where linkage is for other than internal methodological purposes.
Statistics Canada's assessment: Despite the existence of section 13 of the *Statistics Act*, the legislative framework may not be strong enough as illustrated below. Statistics Canada has a Directive on Record Linkage that took effect on August 31, 2011. Following the spirit of the former *Policy on record linkage*, its objective is to ensure the effective management of record linkage activity conducted within Statistics Canada so that the analytical benefits of record linkage support the mandate of Statistics Canada while, at the same time, addressing and mitigating the inherent privacy-invasive nature of the activity. Statistics Canada provided to the Office of the Privacy Commissioner of Canada (OPC) and to the provincial and territorial privacy commissioners the report by Royce. On October 31, 2011, Statistics Canada received a written response from the Privacy Commissioner of Canada that

29. See the definition provided in Section 2.

consolidated the views of the OPC and those of provincial and territorial privacy commissioners (Privacy Commissioner of Canada 2011).

The response acknowledged that section 13 of the *Statistics Act* gives Statistics Canada the right to access records held in any department, municipal office, corporation, business or organization. It also recognized the existence of Statistics Canada's *Policy on record linkage* and *Policy on informing survey respondents* as described by Royce. The response included, among others, the following comments:

> We consider that further work would have to be done to address all of the privacy issues that would arise if a data-linking project of this magnitude were to be put in place. Issues such as the transparency and the ability of individuals to be able to correct and access their own information must be addressed.
>
> In the event that administrative records were to be regularly used for statistical purposes, notification that personal information may be shared with Statistics Canada for enumeration purposes should occur during the initial collection of personal information – that is during the collection for administrative purposes.
>
> Recently tabled amendments to the British Columbia *Freedom of Information and Protection of Privacy Act* include authority for the Lieutenant Governor in Council to make regulations in relation to data linking after consultation with the BC Office of the Information and Privacy Commissioner (OIPC). In addition, all data linking initiatives require notice and submission of a privacy impact assessment to the OIPC. If the option of using administrative records for census purposes were to go forward, the OPC would recommend similarly formal regulation of data-linking initiatives.

Statistics Canada also consulted with the Information and Privacy Policy Division (IPPD) in the Treasury Board Secretariat (TBS).

On the notification to individuals, IPPD echoed the input from the Privacy Commissioner of Canada and confirmed that in the case of a census approach employing existing administrative registers, individuals would have to be notified that their personal information is being shared with Statistics Canada. IPPD added that the requirement to notify would fall to the original collector, i.e., the entity maintaining the administrative register.

On the correction of personal information (in relation to section 11 of the *Privacy Regulations* and TBS Directive on Privacy Requests and Correction of Personal Information), an individual can request a correction to his/her personal information. In the case of the Census Program or other statistical program, any such change would impact the program's output. IPPD stated that the information would not be required to be corrected at Statistics Canada, as it is not used for administrative purposes, but that this would be considered a refusal to correct personal information and would require Statistics Canada to maintain a file of such refusals.

There must be public understanding and approval of the use of administrative data for statistical purposes and public recognition of the advantages of using data already collected for administrative purposes compared to collecting the data again.

Royce's conclusion:

The public acceptability of a census employing existing administrative registers is largely an unknown quantity, but it could reasonably be expected to be opposed by at least some members of the public.

Such opposition occurred in 2000 to the Longitudinal Labour Force File created by Human Resource Development Canada. Internationally, an example of such opposition was observed in the United Kingdom and led to the repeal of the *Identity Cards Act 2006* and the destruction of the National Identity Register.[30]

Statistics Canada's assessment:

Public acceptability remains an unknown quantity. To Statistics Canada's knowledge, no public opinion research has been conducted recently in Canada on this matter.

In her October 31, 2011 written response to Statistics Canada, the Privacy Commissioner of Canada confirmed the importance of such a matter. The response included, among others, the following comments:

> The Report [by Royce] rightly states that a necessary condition for these methodologies [using existing administrative records] would be public understanding of the potential advantages of using data already collected for administrative purposes compared to collecting the data again. Certainly, there would also have to be public understanding of the risks—such as data linking and data losses or breaches—which requires the authority's will and ability to clearly communicate this information to the public at large.

There must be a universal personal identification number (PIN) that can be used to link administrative data across sources at the unit level.

Royce's conclusion:

Canada has no universal PIN. The closest to this is the Social Insurance Number (SIN), but it is not universal and its usage is strictly limited by legislation and by the TBS Directive on Social Insurance Number.

30. "ID cards go up in flames in first step to tackle 'database state'." *The Independent* (London, United Kingdom). February 10, 2011. p. 6.

Statistics Canada's assessment:

There is no universal PIN in Canada.

The SIN presents both undercoverage and overcoverage issues. On one hand, it is not universal. On the other hand, it appears to have serious overcoverage. In her 2002 September *Status Report* to Parliament, the Auditor General of Canada reported that there were 27,247,787 usable SINs referring to the population aged 20 and over on the Social Insurance Register compared to a count of 22,228,225 based on the 2001 Census Program.[31]

In her October 31, 2011 written response to Statistics Canada, the Privacy Commissioner of Canada expressed great concerns around the adoption of a PIN. The response included, among others, the following comments:

> We are deeply concerned with the idea of adopting a universal (and therefore mandatory) PIN as well as legislation permitting the use of the PIN for linking the CPR [Central Population Register] and other administrative registers for statistical purposes.
>
> Our Office and other privacy commissioners have long been opposed to using the SIN as a common identifier. Successive Privacy Commissioners have warned of the dangers of establishing any system of universal identification, be it a modified SIN or some other number.
>
> *A fortiori*, we do not think that the possible benefits of introducing a universal and compulsory PIN for the purpose of gathering reliable statistical data on Canadians would outstrip the very real risks to privacy.

IPPD added that the creation of a unique identifier would require an Act of Parliament and much consultation with the Canadian public. It is a large endeavour and may raise issues related to sections 7 (Life, liberty and security of person) and 8 (Search or seizure) of the *Canadian Charter of Rights and Freedoms*, as the risks and injury to an individual would increase in case of a privacy breach.

The country must have a well-developed set of register systems that fulfil administrative needs but that also contain data covering the most important subject areas for the statistical system. At a minimum there must be a population register, a business register, and a building/dwelling register. The coverage of the registers and the quality of the data contained within them must be sufficiently high to be useful for statistical purposes.

Royce's conclusion:

Canada does not have a population register. Although there are a number of administrative databases, none is sufficiently comprehensive for the Census Program purposes, nor are there common identifiers that would permit them to be linked to create a more comprehensive database.

Statistics Canada has an Address Register. It is used for mail-out of census questionnaires but is not a true building/dwelling register.

Statistics Canada has a Business Register and it is generally of high quality. It was primarily designed for conducting business surveys.

31. See http://www.oag-bvg.gc.ca/internet/English/att_20020901xe04_e_12187.html.

Statistics Canada's assessment:

Population register

Canada does not have a population register. The OPC and provincial and territorial privacy commissioners do not support the creation of a population register.

In her October 31, 2011 written response to Statistics Canada, the Privacy Commissioner of Canada made the following comments, among others:

> Creating a CPR [Central Population Register] raises the very real possibility that the state will create or have access to massive databases containing information on each and every Canadian, detailing some of the most personal aspects of their lives, without their knowledge or consent. A de facto citizen profile would be created.
>
> The Report [by Royce] also indicates that the creation of a possible CPR would not be cost-effective when compared to the existing 2011 Census/National Household Survey program. A CPR would need to provide additional offsetting savings and/or benefits to the government, such as security enhancement, fraud prevention and administrative efficiencies.
>
> Such 'added-value' components to the CPR only compound our concerns as this entails an elaborate national identity system, with vast interlinked databases, complex information-sharing protocols and a vast amount of policies and procedures to tackle system management, and privacy and security challenges.
>
> Moreover, it certainly leads the way towards Canadians losing control over their personal information: control over what information others have about us, control over how they use that information, control over our ability to influence events and decisions that affect our lives. The potential for over-collection, for ever-expanding new purposes, for malicious misuse and for hacking is very real indeed.
>
> Simply put, the creation of a CPR is an option that we cannot support.

Dwelling register

Statistics Canada does have an Address Register (AR). McClean and Charland (2011) did a preliminary assessment of the state of the AR as a nationwide dwelling register.

The AR was originally created as a frame of location-based addresses to serve as a coverage improvement tool for the Census Program. It was used as such in the 1991, 1996 and 2001 cycles. It then became a source of mailing addresses for the 2006 and 2011 cycles. The percentage of private dwellings to which the questionnaires (and letters in 2011) were mailed to went from 66% in 2006 to 79.5% in 2011.

Challenges would have to be overcome to transform the AR into a real nationwide dwelling register. Private dwellings with civic style addresses (which allow unique identification on the ground and direct coding to the National Geographic Database) represent approximately 96% of all private dwellings in Canada, but there are important variations across provinces and territories. For example, in Newfoundland and Labrador the rate is 64% and in Saskatchewan it is 79%.

Canada Post Corporation also uses mailing addresses (other than post office boxes) that sometimes differ from the civic style location addresses. This increases the difficulty in reliably identifying new addresses and may result in overcoverage when the AR is updated with administrative sources between census programs. Administrative sources tend to have mailing addresses and there exists no file that links the location addresses to the mailing addresses.

Adopting standard and civic style addressing across Canada, numbering all apartments, better identifying collective dwellings, implementing a process to be better informed of new dwellings and demolished ones are changes that will favour the move towards a true nationwide dwelling register.

There must be incentives, such as a legal requirement, for the population to register and to inform the register authorities of changes of address. There must also be a reliable way to assign the units included in the registers (e.g., persons, businesses, dwellings) to a detailed geographic level (geocoding) in order to produce small area detail.

Royce's conclusion:

Canada has no population register and no universal legal requirement for Canadian residents to register changes of addresses with the government. After each Census Program, all addresses on the AR are geocoded to the small area level.

Statistics Canada's assessment:

Canada has no population register and no universal legal requirement for Canadian residents to register changes of addresses with the government.

The AR has the capability to perform block-face[32] geocoding that allows the dwelling to be associated to the statistical and administrative geographic hierarchies of the National Geographic Database. Block-face geocoding is easy with civic style addresses. Other addresses rely on the Census Program block coding every five years or a targeted field verification activity, known as listing, in between Census Program cycles.

Dates of changes or events (e.g., change of address, change of employers, births and deaths) must be reliably recorded with minimal delay in recording the event.

Royce's conclusion:

Records of births and deaths of persons are generally reliable and are provided to Statistics Canada. Immigration records are comprehensive, although some of the associated information (e.g., address in Canada, date of entry) may be imprecise. There is no legal requirement for persons leaving the country to report their departure, nor is there a requirement to report internal migration.

32. Generally speaking, a block-face is defined as one side of a street bounded by two other streets. It can be bounded in some cases by a physical feature, such as a river or railway track, or by a municipal boundary.

Statistics Canada's assessment:

As Royce noted, not all basic movements of the population (births, deaths, international and internal migration) are well recorded.

The records of births and deaths of persons (natural growth) are very reliable. The process is improving as the National Routing System (NRS) has begun to accelerate the transfer of vital information of births and deaths from the provinces and territories to Statistics Canada. Currently, seven provinces (Alberta, British Columbia, Manitoba, Nova Scotia, Prince Edward Island, Ontario and Quebec[33]) have signed onto the NRS. Newfoundland and Labrador, Saskatchewan and New Brunswick are expected to join in 2012, leaving the territories yet to commit to a timetable. For small areas, the geocoding of births and deaths may not be accurate as the information is assigned to where the event occurred and not to the place of residence of the parents or of the deceased.

Not all components of international migration are accurately recorded. The Citizenship and Immigration Canada (CIC) database of permanent residents (landed immigrants) is good but has poor accuracy for the addresses, and only has records of immigrant landings since 1980. The CIC database on non-permanent residents (NPRs) has additional issues. Emigration is not recorded.

As for internal migration, there is no process to formally record changes of addresses. Changes of addresses will be recorded in certain administrative programs, such as taxation and benefit programs, and drivers' licences, but there is no single and universal point of recording changes of addresses in Canada.

Summary

Canada does not meet the necessary conditions to conduct a census employing existing administrative registers. Two key registers for this approach—the population and dwelling registers—do not exist in Canada. The Privacy Commissioner of Canada and the provincial and territorial privacy commissioners have clearly indicated that they will not support the creation of a population register in Canada. To become a true nationwide dwelling register, Statistics Canada's Address Register would have to overcome challenges that would require discussion, and eventual action, outside of Statistics Canada.

Nor does Canada have a universal personal identification number that would facilitate the linking of different administrative sources. The Privacy Commissioner of Canada and the provincial and territorial privacy commissioners have expressed great concerns around the adoption of a PIN, as it represents a real risk to privacy, and have confirmed again their long-standing position against the use of the SIN as a common identifier. The Information and Privacy Policy Division of TBS added that the creation of a unique identifier would require an Act of Parliament and would constitute a large endeavour, as it may raise issues related to the *Canadian Charter of Rights and Freedoms*.

Finally, any form of census approach that would involve massive linkage of administrative sources, even without the existence of a population register and a PIN, would be subject to great privacy scrutiny. Issues such as transparency and the ability of individuals to be able to correct and access their own information would have to be examined carefully by both OPC and IPPD. The OPC would likely recommend more formal regulations around such a data-linking initiative.

33. For Quebec, Statistics Canada continues to receive a quarterly file of individual records rather than through the NRS.

7.3 Census employing continuous measurement

The census approach employing continuous measurement collects characteristics from individuals and housing units, where part or all of the collection is performed on a continuous basis. It involves a form of rotating sample. Collection modes may vary, including face-to-face interviews (canvasser approach), telephone (computer-assisted or not) and mail. Some data might be replaced by administrative data to ease respondent burden and/or improve quality.

The United States and France are the two notable examples of this approach. The United States continues to conduct its traditional decennial census for collecting basic characteristics of population and housing units. The more detailed characteristics are collected on a continuous basis through the American Community Survey (ACS) [U.S. Census Bureau 2009]. The survey consists of a sample of more than 250,000 households each month. The ACS data must be pooled over one-, three- and five-year periods to produce estimates for different levels of geography.

France has not kept any form of traditional census and conducts what is called a rolling census (Godinot 2005). For communes (municipalities) with less than 10,000 residents, a complete census is conducted once every five years on a rotating basis. For communes with a population of 10,000 persons or more, an 8% sample of addresses is surveyed each year, for a total of 40% of addresses surveyed over five years. The data are pooled over five years for all geographic areas. The 'legal population' for each geographic area is established annually, with a reference date of January 1 of the middle year of the latest five-year period. For example, the first set of estimates based on the 2004 to 2008 collection had a reference date of January 1, 2006.

Royce (2011, p. 41–46) listed and assessed the following necessary conditions for the census approach employing continuous measurement. Statistics Canada summarizes this initial assessment and complements it by other information that was gathered through different studies.

It generally requires a multi-year program of comprehensive planning, development and testing to implement.
Royce's conclusion: The United States took 18 years (from 1993 to 2010 inclusive) from the research proposal stage to the first publication of five-year estimates. The development of the rolling census in France took 12 years (1997 to 2008 inclusive) from the initial proposal stage to the first full production of results. To produce small area Census Program data in the same timeframe as a traditional 2016 Census Program, a continuous sample survey would have to start full-scale data collection in early 2012, in order to accumulate sufficient sample by 2016. At this time, no development or testing of a continuous survey to replace all or part of the Census Program has been conducted, nor does Statistics Canada appear to have made any assessment of the amount of resources to do so.

Statistics Canada's assessment:

To release small area estimates based on five years of data where the middle point is 2016, data collection would have to be run from 2014 to 2018. This means that the first small area estimates would be released two years (2019) later than a traditional 2016 Census Program (2017). This could seriously impact some uses and users; such impacts would have to be investigated thoroughly.

To start releasing small area estimates in 2017 as would a traditional 2016 Census Program, a continuous survey would have to gather data from 2012 to 2016. The middle point of the reference period would be 2014. This could have legislative implications since the Canadian legislation requires that censuses be conducted in years ending in '1' and '6' (see Section 5.2.1).

Statistics Canada does not have funding to begin planning and designing a form of continuous measurement. This could start only when both financial and human resources are made available to do so. Resources currently allocated to the Census Program are dedicated to the 2011 cycle. Based on this, as well as the U.S. and French experience, the development and implementation of a continuous measurement approach could meet neither a 2017 nor a 2019 start date for the release of small area data.

It requires the agreement of census stakeholders and policy makers to move from a once-every-5- or 10-year snapshot to an annually updated multi-year approach.

Royce's conclusion:

There does not appear to have been any broad stakeholder consultation in Canada on a continuous measurement approach to collecting Census Program data. Both the United States and France have found that a substantial amount of support to users is required to interpret the data.

Statistics Canada's assessment:

Discussions held with the U.S. Census Bureau and the Institut national de la statistique et des études économiques (INSEE) in France have confirmed the importance of user consultation and the amount of user support needed once the estimates start being published.

INSEE confirmed to Statistics Canada that they conducted a multi-year discussion with different stakeholders before implementing the rolling census (Howatson-Leo and Trépanier 2011). In the late 1990s, the idea of a rolling census was being discussed in scientific forums. A legislative review was conducted and led to the adoption in 2002 of the *Loi relative à la démocratie de proximité* that paved the way to move to a rolling census. An advisory committee was formed to provide technical methodology advice to INSEE. Various consultations were held, including the involvement of their Conseil national de l'information statistique (CNIS). Considerable efforts were made to explain the new method, to seek advice and to manage the change efficiently.

Statistics Canada has not consulted broadly on this topic, although a question was asked on this topic during the discussion of the summer and fall of 2011 (see Section 6.1). Users were asked "How important is it that data represent a point-in-time estimate, i.e., a snapshot? An alternative would be a rolling estimate." A definition of a rolling estimate was provided. Overall, among those uses identified

as having a Census Program information requirement, the majority (61%) of them were identified as having an essential or a strong need for a point-in-time estimate. The analysis of feedback to this question is limited given the limited information that could be provided to the users on the nature of a rolling estimate, so this result should be interpreted with caution. It indicates, however, that more information and consultation would be needed for the user community to find this change acceptable.

A geographic infrastructure (address list or maps) is required, but unlike the traditional census, the infrastructure must be continuously updated rather than being updated once just before the census.

Royce's conclusion:

Statistics Canada has an Address Register (as indicated in Section 7.1) and also an area frame for the current Labour Force Survey.

Continuous updating of the AR is a long-term goal, and significant progress has been made in the past few years to develop and use administrative sources and targeted field verification activity, with the eventual goal of supporting the ongoing household survey program, as well as the Census Program. However, a major source of updates to the AR remains the results of the Census Program itself.

Alternatively, area sampling methods similar to those used in the current Labour Force Survey could be used. However, this would result in a less efficient sample.

Statistics Canada's assessment:

Statistics Canada is in the midst of its Household Survey Strategy (HSS) Project. One of the goals of the project is to use the AR not only for the Census Program but also as a frame for other social and household surveys. Many improvements have been made and continue to be made to the AR. Since the 2006 Census Program, the AR has been updated on a quarterly basis with more and more administrative sources and with targeted field verification activity, known as listing. As a result, the AR coverage is very good in population centres. The 2011 Census Program took advantage of this by mailing out letters or questionnaires to 79.5% of the private dwellings.

Surveys can use these parts of the AR as a list frame. However, some parts of the country are not as well covered by the AR and an area frame to complement the AR is still needed. Part of the HSS is the development of a generalized sampling strategy and system for household surveys that will respond to the increasing strengths of the AR while adjusting for its remaining weaknesses. The strategy is being developed while major surveys like the Labour Force Survey and the General Social Survey are being redesigned. The goal is to serve the needs of most household surveys.

The infrastructure being developed under the HSS Project may be ready by fiscal year 2015-2016. If any form of continuous survey were envisioned for the Census Program, it would be necessary to investigate how it can be integrated into the HSS Project infrastructure. Considering the current HSS timeline and the extra planning, development and testing associated with the integration of a new continuous survey, this could not occur in time for the 2016 Census Program cycle.

Several years of data collection are required before the first data for smaller areas can be made available.

Royce's conclusion:

As noted above, using a continuous survey to produce small area data in a timeframe equivalent to a traditional 2016 Census Program would require that the continuous survey begin collecting data by 2012. Such a start date is not possible, and at this point, Statistics Canada does not appear to have formally assessed what a feasible start date could be.

Statistics Canada's assessment:

As noted above, Statistics Canada has not yet started any comprehensive planning, development and testing of using a form of continuous measurement.

To release estimates based on five years of data where the middle point is 2016, data collection would have to be run from 2014 to 2018. The releases would start only in 2019, two years later than the traditional census approach.

It requires substantial annual funding rather than funding clustered in a one- or two-year period around census year.

Royce's conclusion:

The current Census Program funding model in Canada is based on supplementary funding, with a peak in the collection year. Funding is under the control of the federal government, and could presumably be allocated in a different manner, but at the present time no funding of any kind appears to have been allocated for the development of a continuous measurement approach.

Statistics Canada's assessment:

Statistics Canada currently has resources for the 2011 Census Program cycle. This funding will cease with fiscal year 2014-2015. The current funding does not provide the flexibility to start planning, consulting and developing some form of continuous measurement survey as a partial or total substitute to the 2016 Census Program.

Normally, the first discussion around the funding of the 2016 cycle would occur in 2012 and would result in development funding for fiscal years 2013-2014 and 2014-2015. The second discussion would occur in 2014 and would secure funding for fiscal years 2015-2016 to 2019-2020.

It is very difficult to estimate how much a census employing continuous measurement would cost, but once implemented, it is unlikely to cost less than the current Census Program approach.

As mentioned earlier, the United States and France took respectively 18 and 12 years from the research proposal stage to the first publication of five-year estimates, 5 of which were for the collection of data. Based on the U.S. and France experiences, it is estimated that planning, developing and testing would take between 5 to 10 years in Canada. This would require additional funding, as Statistics Canada would have to conduct this in parallel to the traditional Census Program to fulfil the constitutional and legislative requirements described in Section 5.2.1.

Once in place, there would be ongoing costs for the survey. In France, such costs are 54 million euros annually, or 270 million euros over five years, which is approximately 400 million Canadian dollars. However, while France surveys all of its small communes over five years, it only surveys 40% of the population in its large communes, even to derive population counts. The population of France is twice the size of Canada's but the territory is about 20 times smaller. The sparser Canadian landscape will impact collection activities and costs.

Because it is more complex, both in terms of its operations and the resulting data, it requires a high level of professional staff to maintain it and users with the ability to interpret the data.
Royce's conclusion: In principle, Statistics Canada has the professional capacity to undertake the development of a large-scale continuous sample survey. However, an important part of this capacity is allocated to the 2011 Census Program cycle. Under current conditions, it appears unlikely that these employees could begin development work on a continuous sample survey approach before 2012 or 2013, when work on the 2011 cycle is completed.
Statistics Canada's assessment: Same as above. Resources would not be available until 2012 to start work on a different methodology.

Summary

Canada does not meet the necessary conditions for the conduct of a census employing continuous measurement for 2016. France and the United States have confirmed to Statistics Canada the importance of prior and extensive discussions with census stakeholders and policy makers. Results from the discussion undertaken in the summer and fall of 2011 are very preliminary and limited, but they indicate that users are not ready at the moment to move away from point-in-time estimates.

A large-scale continuous survey to partially or totally replace the traditional Census Program would require a significant level of resources up front to allow for proper planning, development and testing before its actual implementation. This would be in addition to the funding needed in the interim to conduct a traditional Census Program.

7.4 Conclusions

Statistics Canada considered three methodology approaches for the 2016 Census Program.

Canada does not meet the necessary conditions for a census employing existing administrative registers. Key to this approach is the existence of a population register and a personal identification number to uniquely identify individuals. Neither a population register nor a personal identification number exist in Canada, and they are unlikely to exist in the short or medium term. The Privacy Commissioner of Canada and the provincial and territorial privacy commissioners have clearly expressed great concerns for the creation of a population register and a personal identification number in Canada.

Canada does not meet the necessary conditions for a census employing continuous measurement. At the moment, Census Program data users value their current point-in-time estimates and a wide consultation with them would be needed to explain the approach and assess whether the resulting information would fit their needs. Resources, in addition to the current Census Program funding, would be needed to allow careful planning, development and testing before implementation.

The only viable approach for 2016 is a traditional Census Program.

8. Content determination framework for 2016

Extensive consultation with users has always been a key activity performed at the start of each Census Program cycle, typically beginning four years before Census Day. As a result, the content of the Census Program has evolved based on changes in Canadian society and the attendant data needs and priorities of the government. For each round of Census Program planning, the competing requirements of time series integrity versus changing priorities and emerging needs are balanced to determine changes to the questionnaire(s). Content decisions must also take into consideration the much broader issues of respondent burden, privacy, quality and cost. Statistical organizations are held accountable to data users, decision makers and the public to demonstrate that they have done so.

A goal of the discussions undertaken in the summer and fall of 2011 (see Section 6.1) was to determine whether criteria could be identified that would distinguish among uses of Census Program topics and whether these criteria could be used to build a content determination framework. A web-based tool was used to structure the feedback, using the seven dimensions described under Step 1 in Table 6.

A more thorough analysis of this structured feedback revealed that relative priorities of different topics could be identified through the information collected using this type of consultation questionnaire instrument. This analysis, along with a review of international practices, provided the quantity and quality of information needed to develop a more structured and transparent framework for determining content in the future. While developing this framework for determining content, and as Statistics Canada came to the conclusion that the only feasible approach for 2016 was a form of traditional census (see Section 7), it was possible to establish what the high-level design characteristics of the next Census Program could be.

The proposed framework for the 2016 Census Program and beyond builds on experience in previous Canadian Census Programs (Statistics Canada 2008b, p. 8), the United Nations (UN) principles of census-taking (United Nations 2008), and approaches developed in other countries, in particular, the United Kingdom (Office for National Statistics 2006). It reflects the views on 2016 Census content criteria presented in the National Statistics Council's *Seeking Solutions* document.[34] The intent is to have a process that is transparent to data users and all Canadians, and takes into account the Canadian context.

Chapter VI of United Nations (2008) states that the topics to be selected should be based upon a balanced consideration of:

- the needs of the broad range of data users in the country
- achievement of the maximum degree of international comparability, both within regions and on a worldwide basis
- the probable willingness and ability of the public to give adequate information on the topics
- the total national resources available for conducting the census.

34. The National Statistics Council (2010) issued a press release on July 26, 2010, which included a statement *Seeking Solutions* which recommended a five-part test for inclusion of questions in the census.

The United Nations Economic Commission for Europe (UNECE 2006, p. 8) of which Canada is a member, suggests the following criteria:

- The topic carries a strong and clearly defined user need.
- There are no other means than the census to collect data on the topic.
- Data on the topic are required for small population groups and/or at detailed geographical levels.
- The topic is of major national importance and relevant at the local level.
- Data on the topic are expected to be used in multivariate analyses with other census topics.
- The content does not differ drastically from previous censuses and where appropriate a new or modified topic can still provide comparison with previous censuses.

As well, the UNECE notes when a topic should **not** be included in a census:

- It is sensitive or potentially intrusive, or requires lengthy explanations or instructions to ensure an accurate answer.
- It imposes an excessive burden on respondents, or seeks information not readily known or that people are unlikely to remember accurately.
- It enquires about opinions or attitudes.
- It is likely to present major coding problems or extensive processing or significantly add to the overall cost of the census.

The proposed content determination framework is a three-step process. It is iterative, meaning that each step is not executed in isolation of the other two steps and that it may need to be repeated, at least partially, as information on other steps is gathered. It begins with consulting external stakeholders on their uses of the data and the related information needs, including the requirements for relevance (topics/variables and frequency) and quality (accuracy, interpretability, coherence).

The second step is the assessment of the Canadian context which encompasses respondent burden and societal privacy concerns. Depending on the issues raised at this stage, there may be a need to go back to the first step to see how these concerns might be addressed in light of the information needs. During this step and also in the next one, the balance of topics, i.e., the number of questions on a given topic as compared with other topics and in the context of total respondent burden, starts to be considered.

The third and final step is the assessment of the Census Program content requirements in the context of Statistics Canada considerations. They include costs, operational factors, safeguards against loss of Census Program data quality and safeguards against loss of efficiency and/or quality in other Statistics Canada programs. This requires consultation with stakeholders internal to Statistics Canada. Again, there may be a need to go back to the first two steps to see how concerns raised might be addressed in light of the information needs.

The table below summarizes the dimensions considered at each step of the process. Details of each step follow.

Table 6 Steps of the content determination framework and their dimensions

Steps	Dimensions	
Step 1: **Census Program information needs** (relevance and quality requirements of users)	• strength of user need • size of the population of interest • suitability of alternative sources • multivariate analysis • comparability across Canada • continuity over time • frequency of outputs	
Step 2: **Canadian context**	• respondent burden • societal privacy concerns	Balance of topics
Step 3: **Statistics Canada considerations**	• costs • operational factors • safeguards against loss of Census Program data quality • safeguards against loss of efficiency and/or quality in other Statistics Canada programs	

8.1 Step 1 – Census Program information needs: establishing relevance and quality requirements via a consultation on uses

The first step in planning any Census Program has always been to consult users about their information needs. The consultation process proposed for the 2016 cycle and beyond builds on previous Census Program consultation processes (Statistics Canada 2008b, p. 8) but includes a framework in order to provide more structure to it. It incorporates the recommendations of the National Statistics Council (2010) and the transparency and structure of the Office for National Statistics' approach in the United Kingdom for their 2011 Census (Office for National Statistics 2006).

The role of users will be to describe their Census Program data needs to Statistics Canada in terms of the seven dimensions under Step 1 in Table 6. The requirements will then be evaluated to establish the priority ranking of each topic and question to determine whether the Census Program is the appropriate instrument for a particular topic/question.

Each topic and each question will first be classified and then ranked from highest to lowest priority on each of the seven dimensions shown above in Step 1.

In terms of the **strength of user need**, 10 different levels of priority have been identified, as shown in Table 7. In general, statutory and regulatory uses, being tied to law, will be highest priority. Uses related to resource allocation and service delivery will also be high priority because of the direct impact on government spending and financial decisions. Planning, development, monitoring, evaluation and performance reports related to programs or policies will be medium priority, as they measure accountability and inform Canadians about efficiency and effectiveness of government programs. The remaining uses, such as research, will be considered lower priority. Those information needs which serve

a purpose which is national in scope will have the highest priority. Given the national role of the federal government, its uses will be assigned a higher priority than other government and non-government uses.

Thus, the highest priority will be given to federal government uses for which there is an explicit or implicit statutory or regulatory requirement. Explicit means that the legislation/regulation mentions the census specifically, while implicit signifies that the Census Program, meaning the census and/or NHS, is the traditional source of information, although it is not explicitly noted in the legislation or regulation. This approach reflects one of the recommendations put forward by the National Statistics Council and referred to earlier.

Table 7 Ranking for the dimension 'strength of user need'

Rank	Use	User
1	Statutory or regulatory: explicit or implicit	Federal government
2	Statutory or regulatory: explicit or implicit	Other government
3	Resource allocation for programs and policies	Federal government
4	Service delivery for programs	Federal government
5	Resource allocation for programs and policies	Other government
6	Service delivery for programs	Other government
7	Planning, development, monitoring, evaluation, and performance reports related to programs or policies	Federal government
8	Planning, development, monitoring, evaluation, and performance reports related to programs or policies	Other government
9	Research and other uses	All users
10	No user need	

In terms of the **size of the population of interest**, a higher priority will be assigned to uses that require data for small geographic areas or small groups of interest. This constitutes one of the essential features of a Census Program (see Section 5.1) and is consistent with the UNECE criteria and the National Statistics Council recommendations referred to earlier. It recognizes that data needs for larger geographic areas/population groups can be collected through sample surveys while it is difficult to do so for smaller geographic areas or population groups. As a result, needs for data by dissemination area or by census tract will be higher priority than those at the census metropolitan area (CMA) level, which in turn would be higher than those at the provincial/territorial level. Likewise, needs for smaller populations of interest such as recent immigrants, would be higher priority than those for larger groups such as the employed population.

With respect to the **suitability of alternative sources**, those topics for which no alternative sources exist will be highest priority while those for which alternative sources are readily available will be lowest. Again, this is consistent with the UNECE criteria and the National Statistics Council recommendations.

Multivariate analysis is the ability to examine the interrelationships among the different variables, for example, age, education, income and immigrant status. This type of analysis is possible using Census Program data because all variables derived from the questions are available for each individual, household and dwelling, with a common reference point (e.g., Census Day). It is a significant strength when used to examine complex relationships among variables. Those uses for which there is a

requirement for multivariate analysis or cross-classification of data will be higher priority than those for which a one-dimensional profile is needed. This is another of the UNECE criteria.

In terms of the need for data to be **comparable across Canada** and the need for data to be comparable over time (**continuity over time**), i.e., for trend analysis, for each of these two dimensions, highest priority will be assigned to uses for which comparability is essential and lowest priority to those for which there is no need. These are based on the UNECE criteria of including topics of national importance (comparable across the country) and that will provide comparison with previous Census Programs.

Finally, as these dimensions are to help determine the content of the 2016 Census Program, the highest priority for **frequency of outputs**, will be topics which are needed every five years, i.e., to be collected in 2016, followed by those which are needed every ten years, i.e., not before 2021. Those which are needed only one time or more frequently than every five years would be lowest priority as the Census Program is likely not the appropriate collection instrument.

Once each topic and each question is classified and ranked from highest to lowest priority on each of the seven dimensions, the information for a topic/question will be synthesized to give an overall high, medium, low information need priority to the topic/question. Of these seven dimensions, the ones which will be most important are strength of user need, followed by size of population of interest and suitability of alternative sources.

The above list of topics and questions will be further classified into topics and questions that require a higher or lower level of precision and a higher or lower level of detail. For those topics and questions that have been asked in the past, the recent split between full enumeration and sample-based collection will be an important aspect to consider.

The ultimate output of Step 1 will be a preliminary list of topics and variables which could be divided into up to three possible groups:

- Full enumeration – To be asked of 100% of the population because they have a high information need priority **and** they require a very high level of precision at the very smallest sized population of interest (geographic levels)
- Sample – To be asked of a sample of the population because they have either a high or medium information need priority **and** they require a lesser degree of precision
- Not to be collected in the Census Program – They have the lowest information need priority or may be more suitable for collection through other statistical programs.

8.2 Step 2 – Canadian context: addressing public acceptability with respect to respondent burden and societal privacy concerns

The second step is to assess the public acceptability of each question and each topic in terms of two dimensions: respondent burden and societal privacy concerns. This step will be undertaken in consultation with the National Statistics Council, and federal and provincial/territorial privacy commissioners. Information from subject matter and methodology areas within Statistics Canada will also inform this discussion.

Respondent burden is defined as the perceived difficulty, dissonance or intrusion that individuals associate with a question/topic they are being asked to answer. A number of factors can contribute to respondent burden. Among others are the nature/sensitivity of the question sometimes stated as privacy concerns, the question wording and answer categories, its position in the questionnaire, the fact that the question refers to data already provided to government, or provided previously in the questionnaire itself, and the lack of understanding of why the question is being asked.

The consequences of respondent burden are that the respondent will not answer the question, will answer it poorly or will answer it accurately but with some level of difficulty and/or some level of annoyance. Although there is no universally-agreed-to single measure of respondent burden, indicators of respondent burden include, among others, previous levels of non-response and imputation to the question/topic, the time to answer it, the number of times respondents quit once they reach that question/topic and later return, and negative comments provided. The comparison of such indicators across Census Program questions and topics is important to assess the relative burden.

The average response burden imposed on Canadians is also an aspect to examine. Questions asked to a sample of the population result in a lower average burden than if the same questions were asked on a full enumeration basis. Respondent burden can also be examined over Census Program cycles.[35]

Societal privacy concerns refer to how privacy guardians in Canada, namely the Office of the Privacy Commissioner of Canada and its provincial and territorial counterparts, assess the privacy intrusiveness associated with questions and topics.

Step 2 will rank topics/questions from the most to the least burdensome and privacy intrusive topics/questions. The most burdensome and privacy intrusive topics and questions could dictate a need to revisit the priorities identified in Step 1 to determine whether there is a less burdensome or less intrusive way to collect the information (including the possibility of using administrative data) or could dictate that the data have to be collected on a voluntary basis rather than a mandatory basis.

Another aspect that will need to be considered is the balance of topics, i.e., the number of questions on a given topic as compared with other topics in the context of total respondent burden and size of each block of content. Decisions should take into account the priority of information needs assigned as a result of Step 1.

The ultimate output of Steps 1 and 2 will be a refined list of topics and variables that could be divided into four possible blocks:

- Mandatory full enumeration – Topics/variables labelled for 'full enumeration' in Step 1 for which there are no major indications of burden or privacy intrusiveness
- Mandatory sample – Topics/variables labelled for 'full enumeration' in Step 1 for which there are major indications of burden but no major indications of privacy intrusiveness, and topics/variables labelled for 'sample' in Step 1 for which there are no major indications of privacy intrusiveness
- Voluntary sample – Topics/variables labelled for 'full enumeration' or 'sample' in Step 1 for which there are major indications of burden **and** privacy intrusiveness
- Not to be collected in the Census Program – Technically the same topics/variables as in Step 1.

35. For example, 5 minutes of content asked to 100% of the households and 25 more minutes of content asked to 25% of the households results, on average, in 11.25 minutes of content per Canadian household in a Census Program cycle. Using this same sampling fraction over two cycles, only 6.25% (i.e., 25% x 25%) of households are likely to get 30-minute content both times. More than half, 56.25% more precisely, are likely to get 5-minute content both times. The rest, 37.5%, are likely to get 5-minute content once and 30-minute content once.

This division into mandatory and voluntary is consistent with the criteria in Statistics Canada's *Determination of Mandatory and Voluntary Surveys Guidelines* (Statistics Canada 1997) which balance the need for the information, e.g., to fulfil statutory or regulatory requirements, against the sensitivity of the information, keeping in mind that an adequate response rate must be attained to provide reliable information to meet the objective(s) of the survey.

In other words, topics/variables first identified as requiring 'full enumeration' in Step 1 could be moved at this point to the 'mandatory sample' if there is a very strong indication of response burden or further moved to the 'voluntary sample' if there is in addition a very strong sense of privacy intrusiveness. This should occur in rare circumstances only as topics/variables first identified as requiring 'full enumeration' in Step 1 refer to high priority information data needs that require a very high level of precision at the very smallest sized population of interest (geographic levels). Using the same logic, topics/variables first identified as requiring 'sample' could be assigned to the 'mandatory sample' group if there is no strong sense of privacy intrusiveness. If there is, they could be moved to the 'voluntary sample.'

It is important to note that on one hand, the lowest information need priority topics/variables that were classified as 'not to be collected in the Census Program' as a result of Step 1 will not be 'promoted' as a result of Step 2. Low burden and privacy intrusiveness with a topic or variable are not sufficient to justify adding that topic or variable to the questionnaire(s); there must first be a demonstrated high or medium priority information requirement. On the other hand, it is unlikely (but not impossible) that topics/variables that had high and medium information need priorities in Step 1 fall to the 'not to be collected in the Census Program' category because of burden and sense of privacy intrusiveness. These should be only the most extreme cases and closely examined. The examination could reveal that such topics/variables are more suitable for collection through other statistical programs.

8.3 Step 3 – Statistics Canada considerations

There are four additional dimensions to be considered in determining which topics/variables should be collected in 2016 and whether the questions should be mandatory or voluntary. These are: costs, operational factors, safeguards against loss of Census Program data quality and safeguards against loss of efficiency and/or quality in other Statistics Canada programs.

In terms of **costs**, Statistics Canada must consider whether collecting the information significantly increases the length of the questionnaire or the costs of processing it. Further, Statistics Canada must consider the cost and data quality trade-offs between collecting data on a voluntary versus mandatory basis. As reported earlier in Section 4.1, analysis of the test conducted on the American Community Survey (ACS) in 2003 to assess the impact of making it voluntary has estimated that to preserve the same data quality from a voluntary ACS, the costs would increase by 48% (Griffin 2011).

Operational factors that may dictate certain information to be collected include, for example, names, telephone numbers and addresses to ensure that quality data are collected in an efficient manner. Other questions may also be asked for coding purposes. For example, if it is decided that industry coding is a Census Program variable, the name of employer might be needed to assist the detailed industry coding unless another way to obtain the information is found. These questions would not normally be identified in an external user consultation.

Safeguards against loss of Census Program data quality refer primarily to topics and questions that may be relatively more burdensome and/or privacy intrusive. While burden and privacy considerations might weigh in favour of asking such questions on a voluntary basis, non-response rates should also be analyzed to identify differential non-response patterns, i.e., groups that are less likely to participate. These burdensome and privacy intrusive topics/questions that show differential non-response patterns and for which there are indications that they could be used to mitigate non-response bias for other questions collected on a voluntary basis could be collected on a mandatory basis.

Information collected in the Census Program is needed to provide **safeguards against loss of efficiency and/or quality in other Statistics Canada programs**. Examples of such needs were presented in Section 6.3 of this report.

It is not determined at this point how the four dimensions described above would interact and influence the moving of topics/variables from one block to another. No attempt is made in this report to describe it in detail. It is anticipated that some topics/variables could be moved to the blocks 'mandatory full enumeration' and 'mandatory sample' because they greatly improve the quality and efficiency of the Census Program or of other Statistics Canada programs while keeping costs, response burden and societal privacy concerns within acceptable limits. The overall balance of topics would be looked at again in this step.

It is important to repeat finally that although the three steps above were presented sequentially, the whole process will in fact be iterative. Changes made in Step 2 could require a repetition of Step 1. Similarly with Step 3, it could be needed to go back to Steps 1 and 2.

8.4 Conclusions

The content determination process used for 2016 and beyond should build on previous Census Program processes and:

- be open and transparent for stakeholders and data users, as well as for the Canadian public
- demonstrate evidence-based decision making in reaching content determination conclusions.

As long as the Census Program in Canada remains a traditional one,[36] the process should include three main steps that could require multiple iterations:

- **Step 1**: A consultation with external stakeholders on their uses of the data to determine relevance, timeliness and quality requirements. The requirements will be prioritized, based on the dimensions outlined in Table 6, and could result in a division of the content into three groups:

  (1) To be asked on a full enumeration basis – It represents a high information need priority **and** requires a very high level of precision at the very smallest sized population of interest (geographic levels)
  (2) To be asked on a sample basis – It has either a high or medium information need priority **and** requires a lesser degree of precision
  (3) Not to be collected in the Census Program – It has the lowest information need priority or may be more suitable for collection through other statistical programs.

36. A different approach does not rule out the process explained in this section entirely, but would require that the process be adjusted in light of the new approach.

- **Step 2**: A discussion with internal stakeholders to assess if the proposed content would likely generate excessive response burden, and with external advisory bodies such as the Office of the Privacy Commissioner of Canada and the NSC to determine whether the proposed content raises serious societal privacy concerns. The balance of topics will also be looked at in this step. This could result in four possible blocks:

  (1) Mandatory full enumeration – Topics/variables labelled for 'full enumeration' in Step 1 for which there are no major indications of burden and privacy intrusiveness
  (2) Mandatory sample – Topics/variables labelled for 'full enumeration' in Step 1 for which there are major indications of burden (but no major indication of privacy intrusiveness) and topics/variables labelled for 'sample' in Step 1 for which there are no major indications of privacy intrusiveness
  (3) Voluntary sample – Topics/variables labelled for 'full enumeration' or 'sample' in Step 1 for which there are major indications of burden **and** privacy intrusiveness
  (4) Not to be collected in the Census Program.

- **Step 3**: A discussion with internal stakeholders to assess Statistics Canada considerations such as those related to costs, operational factors, safeguards against loss of Census Program data quality and safeguards against loss of efficiency and/or quality in other Statistics Canada programs. The balance of topics will also be looked at in this step. This could result in some further changes to the content assigned to each block in Step 2.

Finally, the discussion approach and the online questionnaire tool used to gather feedback in the 2016 Census Strategy Project, with further refinements, will be used in future consultations to engage more broadly on information needs at the topic and variable level.

9. Conclusions

Following every Census Program cycle, Statistics Canada reviews its collection and processing methods as part of its evaluation and quality assurance processes. Changes introduced in the 2011 Census Program initiated an even broader and in-depth review. In particular, during the summer of 2010 there was a heightened debate on issues of privacy and the relevance of the information collected as part of the Census Program. At the same time, there have been questions regarding the extent to which a voluntary National Household Survey (NHS) can produce results of sufficient data quality to meet users' requirements. The quality of the NHS results will not be fully known until the data have been processed and evaluated. The results are scheduled to be released in 2013.

Feasible approach for the 2016 Census Program

The 2016 Census Strategy Project examined various methodological approaches that are used around the world for conducting a census to see what alternatives exist, if any, for the Canadian Census Program in 2016 and beyond.

This report examined the three major types of methodology approaches used internationally for conducting a census: the traditional census approach, the census approach employing existing administrative registers and the census approach employing continuous measurement. Drawing on work conducted by Royce (2011), Statistics Canada assessed whether the necessary conditions for using each approach were likely to be present in time for the 2016 Census Program. The results of this assessment indicate that of the three approaches examined, the traditional census is the only viable methodology for the 2016 Census Program.[37]

More specifically, the necessary conditions for the conduct of a traditional census approach are expected to continue to exist in Canada for 2016. The degree of public cooperation with the census (mandatory) is still at high levels. While the response to the NHS is comparable to Statistics Canada's other voluntary household surveys, further study will be required once the assessment of the quality of the NHS results is completed to determine the extent to which the NHS was able to deliver estimates of sufficient data quality for lower geographic areas and small population groups.

Canada does not meet the necessary conditions of a census approach employing existing administrative registers. Although this approach is being used by an increasing number of countries, two keys to this approach are the existence of a population register and a number that uniquely identifies individuals. Neither exists in Canada nor are they likely to exist in the short or medium term. The Privacy Commissioner of Canada and the provincial and territorial privacy commissioners have clearly expressed great concerns for the creation of a population register and a personal identification number in Canada.

Adoption of a census approach employing continuous measurement is also not feasible for the coming Census Program. To replace all or part of the 2016 Census Program, such a methodology would have to be in place by 2012. France and the United States have confirmed to Statistics Canada the importance of prior and extensive discussions with census stakeholders and policy makers. No funding has been allocated for consultation, development and testing for a continuous measurement survey at this point.

37. This finding is also the view of the National Statistics Council and the international Expert Panel Review Committee.

Moving forward, the balance between relevance, quality, respondent burden and privacy will need to be examined as part of the content determination process for the Census Program. For 2016, external stakeholders will be consulted on their uses of the data to determine relevance (including timeliness) and quality requirements. In particular, priorities would be assigned based on the strength of user need. The consultation findings would be examined in light of respondent burden, societal privacy concerns and other considerations, such as costs, that Statistics Canada must take into account. Results of this assessment could be the division of the content into questions to be asked on a full enumeration basis, questions not to be collected in the 2016 Census Program and, potentially, those questions to be asked on a sample basis. The 2016 Census content will continue to be prescribed by the Governor in Council.

Continue to improve the census operations

As is customary following a Census Program cycle, Statistics Canada is presently reviewing all of its operations and will incorporate improvements and efficiencies whenever possible. Three examples follow:

The Address Register has enabled the 2011 Census Program to successfully mail out letters and forms to close to 80% of the private dwellings in Canada. Work continues to further improve the coverage of the Address Register for the 2016 Census Program, including targeted field verification and the use of administrative data sources. Statistics Canada is working with external stakeholders on how to best manage regional varieties of addresses. In addition, it will work with Canada Post Corporation to optimise the use of civic style addresses to expand the mail-out methodology for the 2016 Census Program.

The Internet has become the primary mode of collection for the Census Program, as almost 80%[38] of Canadian households currently have access to the Internet. In 2011, almost 54% of Canadian households completed their 2011 Census questionnaire on the Internet, a significant increase from 18% in the 2006 Census. As well, about 64% of all NHS respondents chose to complete the NHS online.[39] With Internet now the primary mode of collection, Statistics Canada is examining the opportunities this offers for activities such as questionnaire design and data processing.

While the census approach employing existing administrative registers is not currently feasible in Canada, the use of administrative data within a traditional Census Program can nevertheless reduce respondent burden and improve quality. Statistics Canada has for a number of Census Program cycles used administrative data for the Address Register, for quality assessment and as a substitute for questions (i.e., income). Statistics Canada will continue to examine the potential for using new and existing sources of administrative data for the 2016 Census Program.

Beyond the 2016 Census Program

This report traced among others the evolution of the Canadian Census Program since 1871, and how content, methods and quality assurance practices have adapted to changes in society. It is anticipated that future cycles will also experience change and would benefit from the tradition of the Census Program five-year cycle to evaluate and test new methodologies and technologies. These often come to complete fruition only in later cycles, as was the case in 2011 when Internet, after two cycles of testing and progressive implementation, surpassed paper as the primary mode of collection. The 2011 Census Program also saw the transformation of the mandatory long form to the voluntary National Household Survey.

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38. 2010 Canadian Internet Use Survey, Statistics Canada, *The Daily*, May 25, 2011.
39. More details on the Census Program collection methodology were presented in Section 4.1.

This report concludes that the traditional census approach is the only viable approach for 2016. Research on alternative methodologies should continue on a long-term horizon, beyond the next Census Program cycle. Research to date has indicated that unless there are significant changes to the Canadian context, many of the issues surrounding the alternative approaches will remain for 2021 and beyond. For example, the discussion of a population register and a personal identification number has raised great concerns from the Privacy Commissioner of Canada and her provincial and territorial counterparts. There has also been no demonstrated support by Census Program stakeholders for the census approach employing continuous measurement. As well, the development timelines and costs for census approaches other than the traditional one are considered to be quite significant.

If changes are envisioned for 2021 or even later cycles, it is thus important that research continues. A key element of this research will include increased use of administrative data in the Census Program and the Population Estimates Program to reduce respondent burden and/or improve quality and efficiency. This will involve examining the potential for expanding the use of existing administrative data files and exploring partnerships to use additional ones, in accordance with privacy-related policies and directives.

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